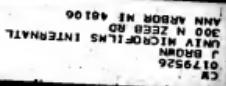


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Editorial Insider

What Is Moving Overseas?

Are the doomsayers right in crying that the U.S. high-tech sector is in danger of losing its leadership position? Even as American name brands dominate and control the worldwide computer market, their product components are being manufactured by overseas suppliers. Korea has cornered the market on computer terminals and Japan now controls most of the computer printer and disk drive markets. Critics contend U.S. companies are in danger of becoming distribution businesses for foreign manufacturers, while many American manufacturers claim overseas manufacturing is the only way to keep costs down and remain competitive.

Who is right? Recent statistics aren't encouraging. Last year the deficit in the exchange of high-tech products between the U.S. and Japan grew to \$15 billion and exceeded the deficit for autos. This year, the high-tech figure is expected to reach \$20 billion. The softening of the market and the inflated U.S. dollar can both be blamed in part, but the problems go far beyond those factors.

A recent report submitted to the White House on behalf of the President's Commission on Industrial Competitiveness proposed some alternatives. Headed by John A. Young, Hewlett-Packard Co.'s president, the committee stated that the U.S. is spending too little high-tech money on civilian research and development — less than our trading partners, when the figure is considered as a percentage of gross national product. The committee also reported a failure on our part to incorporate more technologically efficient manufacturing methods so that we can be more competitive. Adversarial relationships between management and workers need to be addressed, and more needs to be done to help the work force adapt to the changing technology, the committee charged.

The commission addressed the need for a cabinet-level science and technology department to coordinate research efforts and a trade and industry department to focus federal resources on international competitiveness. The commission also stated the importance of retaining the R&D tax credit and trimming the federal deficit to ease interest rates.

It seems apparent that without some of these changes, more high-tech companies will be moving manufacturing operations overseas. Some don't see this as a problem. Other sectors maintain it will lead to increased vulnerability, and they cite the consumer electronics market as an example.

Solutions won't be easy — even after 18 months of study, Young's committee was unable to come up with a definite plan of action. One thing is clear, however. We as an industry need to take action against any potential threat to our leadership position.



Exploring New Territory

By Tom Willmott

The most significant management information systems planning challenges today do not come from the data center or the desktop computer. Data center planning activity has largely been mastered. The role of the personal computer in most organizations is relatively well understood. As a result, both users and vendors are focusing increased attention on the apparent vacuum between the data center and the microcomputer.

Widespread use of microcomputers has led to an investigation of the need for personal computer-area networks and micro-to-micro communications. The success of the personal computer as a multi-function workstation has caused business executives to consider the acquisition of new departmental systems. Attention is now drawn to the potential for emerging technologies and new applications, and the incremental value to be gained by the acquisition of more robust, mid-range systems should be reviewed.

Advancing technology, price and performance advantages and increasingly sophisticated user demands are placing enormous pressure upon traditional time-sharing and word processing systems. It is possible that these unstable layers of the information architecture will evolve into a new generation of mid-range systems. Filling the gap between the data center and the microcomputer is the real challenge of the day.

The evolution of automation describes the framework within which potential demand for mid-range systems is taking shape. Market analysis shows that the emphasis in the phrase "potential demand" remains on "potential." The industry is still groping for an answer to one important question: What are the real benefits to be gained, not only from the acquisition of mid-range hardware, but also from the applications software that might run on this mystery machine? To date, there have only been a few products upon which to base any judgment.

Analysis of initial market and demand characteristics indicate that mid-range applications software benefits may fall into three functional areas:

• Communications interconnection

The capability of serving as a communication controller, server or gateway between host systems and workstations or low-end processors.

• Peripheral servers

The capability of acting as a central site at which access to

disk storage, printers, modems and other peripheral devices may be shared by multiple workstation users.

• Applications processing: The ability to process applications for access at multiple workstations within a department or work group.

Surveys of large organizations indicate that the application requirements of departments and work groups within these organizations are largely unexplored. Thousands of groups within large organizations around the country have yet to take advantage of mid-range systems. A premium exists among users who the software applications traditionally associated with office automation are cute, but not cost-justifiable. The suspicion lingers that tickler files and electronic mail are not worth the price of admission. Users are concerned with applications that solve real business problems, and these are often applications for which the DP department simply does not have time.

The array of WP, voice annotation, calendaring, electronic mail and tickler files when what you really need is a straightforward data base management system (DBMS) that allows nontechnical users to gain access to the information they need. Mainframe DBMS applications, for example, allow several users to simultaneously access and update records in a common file.

What's the matter with existing microcomputers? There is nothing inherently wrong with single-user DBMS, but they simply do not offer the power, flexibility and security of a mainframe architecture. In addition, the potential exists for the creation of multivendor vertical applications that automate departmental routines. Although the convenience and power of these potential software products gives promise to further improvements in office productivity, it is clear that users and vendors have only begun to deduce the resources required to understand the application needs of the department or work group.

Admittedly, mid-range applications represent just a fraction of the total software market. And yet, research indicates that it is an area of maximum concern to information systems planners.

III

Willmott is vice-president of user research for International Data Corp., in Framingham, Mass., and a regular columnist for Computerworld Focus.

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Q&A

The value-added reseller (VAR) market is becoming a growth industry, providing microcomputer vendors with lighter channels of distribution to meet increasing user demand for specialized applications. VARs help position many micro hardware and software vendors into lucrative vertical market niches. Users are also discovering the value-added part of VARs can include more personalized service and expertise than either retailers or manufacturers can provide. Computerworld Focus spoke with Steve Molis, director of International Data Corp.'s Microsofts Research program, about the coming of age of microcomputer VARs.

How has the VAR market evolved?

The VAR market has been evolving since the '50s when IBM realized it could not successfully solicit the federal government, among others. To penetrate the government market, IBM developed its own "reseller channel," a term eventually replaced by the acronym OEM. Digital Equipment Corp. also gained prominence by developing its own reseller or OEM channel to go after the scientific marketplace with its minicomputers. The evolution we are now seeing focuses on vendors that have traditionally sold main and related products and that are now extending their product lines to include micro products, peripherals, accessories and stand-alone productivity tools.

Companies are doing this because they don't want to lose their customer base to another vendor that may be able to migrate customers up to larger systems, so they're all trying to round out their product lines. The real growth in the VAR market is in the area of system integrators. These resellers buy hardware and software products, then customize the system somehow for the end user — perhaps by putting a front end or a forms generator on it. The most rapid growth among microcomputer resellers is in systems integration, mainly because micros represent an entry level and provide a relatively low development cost. There is also a need in the marketplace right now to address niche or vertical markets with micros. Systems integrators are doing just that.

Another VAR growth area deals with captive audiences. Vertical businesses such as Merrill Lynch, for example, are now becoming active VARs of their own specialized financial software products. Associations such as PTD and the American Dental Association have produced specialized software products and are becoming legitimate VARs because they can sell directly to their own members.

An additional area in which VAR expansion is occurring is through time-sharing and mainframe software companies extending their software to run on micros. These are all part of the fast-growing curve of the VAR market.

Are there companies that have started as microcomputer VARs and are now extending upward to provide larger, more complete system offerings?

It depends really on the companies these microcomputer VARs associate with. If they are doing business with suppliers offering complete product lines, then it's a lot easier for microcomputer

VARs to migrate upward to larger systems. For the most part, however, when a VAR starts in the microcomputer arena with a specific vertical market, the tendency is to keep focusing on that particular field of expertise.

Is there any sort of penetration of microcomputer VARs into larger corporations and MVS departments?

No, I just don't see any real penetration there. The whole premise of a VAR involves adding some sort of expertise, especially if the VAR is predominantly selling microcomputer expertise in a given vertical market. MIS directors in major corporations are looking for generic ap-

plications, and 30% to 40% of corporate purchases are made directly from the vendor. Purchases may be delivered through a reseller, but they are sold by the vendor. We don't see the VAR channel really addressing the corporate marketplace per se, but rather the niche markets, the vertical markets.

Third most in some niche applications microcomputer VARs can offer, for example, in the Fortune 500.

They're limited. If you're talking about such specific software applications as micro-to-mainframe or micro-to-end link packages that perhaps have been developed by systems houses, then you can

see the use of a VAR. But when the type of installation you're talking about is the purchase of mass quantities for generic applications and the only value-added is training on Lotus 1-2-3, I don't think the VAR will be the reseller channel accessed. Stores such as Micro Age, Best Buy, and Entrix are best suited for those situations.

Are super-VARs emerging that can offer total solutions for automating the office right through the mainframe level?

Some systems houses offer that now. Actually, the range of specialization

(Continued on Page 44)

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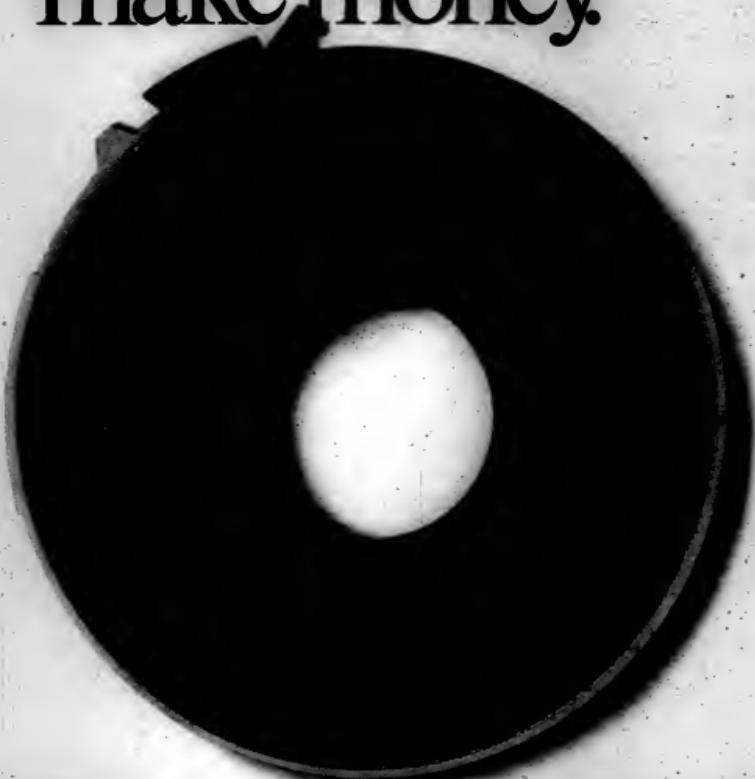
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In the News

Ready To Move?

Both voice synthesis and voice recognition, parts of the technology known as digital signal processing, have gone their separate development ways in recent years, and both have enjoyed separate levels of success.

A study from International Research Development, Inc. (IRD), a Norwell, Mass., research firm, points out that the voice synthesis industry "is destined if it overcomes initial snags," expecting to account for about \$100 million in 1985 revenues. Voice recognition, however, is currently garnering a fairly dismal \$10 million.

A major problem with voice recognition has been the technology itself. Artificial restraints on users and marketing tactics have created an unfavorable image. Aside from these problems, IRD said, during the past five years voice input has been extensively tested and/or implemented in a number of areas — for example, manufacturing and industrial applications, military and aviation use or voice-activated entry systems. In fact, IBM might just help things along. An announcement from IBM is expected soon of a voice-activated typewriter (VAT). The VAT will reportedly be an isolated word speaker-dependent system capable of recognizing a 5,000-word vocabulary with better than a 95% accuracy

rate, IRD said. According to IBM, the system will even be able to distinguish between homonyms like "two" and "to."

With IBM's active entrance and the rectifying of many of the problems that have plagued voice recognition technology to date, IRD predicted that by 1995 the market for voice recognition could reach a healthy \$500 million, a figure not greatly behind the projected \$1.5 billion in revenues voice synthesis products are expected to produce in the same year.

Hiring Up

Employment openings in the data processing field continue to rise, according

to a recent Data Processing Management Association (DPMA) international membership survey.

Of the respondents, 42% said they plan to increase their staff during the second quarter of 1985, and an additional 54% will maintain current staffing levels. Information systems and DP staff size, DPMA members indicated they will each hire an average of 6.5 individuals during the second quarter of 1985; of these, approximately 3.5 MIS and DP professionals will fill new positions and three individuals will be recruited for existing positions. Although the market continues to be most promising for programmers and systems analysts, DP professionals are also needed in more specialized growth areas such as telecommunications and data base administration.

The survey also pointed out that programming positions will represent 40% of all MIS and DP job openings; systems analysts will account for 33%; telecommunications specialists, 7%; data entry operators, 7%; data processing managers, 5%; systems managers, training coordinators and project leaders, 5%; and microcomputer specialists, 3%.

In a related survey, 67% of DPMA members indicated their 1985 DP budgets will increase over 1984, with 40% of the new budgets going to personnel expenditures. The average budget was \$2.1 million, representing 6.5% of total corporate revenues. Large systems (mainframes and minicomputers) accounted for 24% of the average DP budget, followed by 14% for software, 7% for telecommunications, 5% for microcomputers, 5% for training and education, 3% for office automation and 2% for data security.

Also of note, the DPMA study found 69% of the DP executives see the continuing influx of microcomputers and personal computing applications as the greatest trend affecting their departments in 1985.

DP Salaries Up 5%

Salaries in 1984 for U.S. DP employees increased 5% over 1983 salaries, according to a recent salary survey by the Administrative Management Society (AMS).

Salaries were reported as of September 17, 1984, covering 57,479 employees with 2,366 companies in 114 U.S. cities.

The salaries were broken down as follows: software systems programming manager, \$40,000, a 5.8% increase over the \$36,000 1983 figure; applications programming manager, \$40,000, up 3.4% from \$38,700; data base administrator, \$36,400, up 4% from \$33,000; lead programmer and analyst, \$35,600, up 5.3% from \$33,800; computer operations manager, \$35,400, up 1% from \$35,000; senior software systems programmer, \$34,700, up 8.8% from \$31,900; and systems analyst, \$30,900, up 4.4% from \$29,600.

The 5% overall salary increase registered in 1984 compared with an average 7.7% salary increase for non-DP middle management, the latter figure taken from another AMS survey conducted during the same period.

With regard to the DP salary survey,

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ANS found the merit raises was most often used by companies to grant increases to exempt (salaries) and nonexempt (hourly) employees. Either alone or in combination with other methods, merit raises were used by 78.8% of the companies for exempt employees and 81.8% for nonexempt. DP employees' merit increases, alone or in combination, were used by 24.6% and 20.3% for nonexempt employees. Other methods accounted for 18% and included cost-of-living, longevity and equity.

Capital Cause

The Capital PC User Group (CPCUG), a 3,000-member organization based in Gaithersburg, Md., has decided that personal computer software users have been ignored too long in the rush by software vendors to stamp out software piracy.

In a proposal entitled "Bill of Rights for Software Users," CPCUG has listed what Dave Browning, CPCUG director of vendor relations, termed "five essential rights inherent in the consumer use of commercial software."

"Copy protection for software vendors is obviously important," Browning said, "but the industry in general has ignored other, more fundamental rights of software users."

Browning made it clear the group's Bill of Rights is intended only for the software industry and not for any government agencies, the intention being to work with the industry and not against it through some possible legislative action.

"What we have to remember is that the computer software industry is unlike any other," he said. "Users are taking for granted that the same kinds of built-in rights and quality controls you find in other industries apply here. A lot of software users, for example, aren't even aware that they did not purchase outright the program they paid for in the retail store. Limited use licensing is something both foreign and confusing to users. Consumers should also expect to have the software product they buy first subjected to minimum quality control standards such as are found in the automobile, appliance and toy industries."

"One simple way of discouraging copyright violation and software piracy is for vendors to offer some sort of rebate or discount on separate, multiple purchases of software copies. A department that has purchased 19 separate copies of a certain software program and is ready to purchase another 20, is probably going to finally become leery about paying another \$500 for another copy when the software vendor does not at least offer some sort of discount or rebate incentive. Who wouldn't be tempted to start making illegal copies?"

Briefly, the following is a list of consumer rights that Browning and CPCUG intend to present to the software industry.

Right to Product Quality — The right to expect a software product to perform with a level of quality consistent with industry-specified or implied standards.

Right of Functionality — The right to expect a software product to perform basic functions common to the generic program type, with any exceptions or caveats fully disclosed prior to purchase.

Right of Continuous Service — The

right to have on hand sufficient copies of program packages and authorization devices to continue operations uninterrupted by loss of or damage to the primary package or authorization service.

Right of Program Support — The right of access to information from the software manufacturer concerning known errors, fixes or temporary workarounds. The user also has the right to reasonable updates to the released versions for the correction of errors.

Right of System Integration — The right to integrate software products into the system environment without undue constraint or interference from copy-protection, software authorship or other extraneous program functions.

Big Blue Elephants?

In a move that surprised few industry watchers, IBM last month announced price cuts of up to 12%, effective immediately, on its Personal Computer and Personal Computer XT, and introduced two long-awaited versions of its PC XT. The action is expected to be the forerunner of its next big announcement, the PC2.

In addition, according to industry watchers, IBM is expected to announce its version of the low-end computer in the near future.

The price cuts on the PC apply only to the two-disk-drive machines. The PC with 256K bytes of memory was cut 5% to \$2,295; 64K bytes were cut 6% to

\$2,115; and the Portable Computer was cut 4% to \$2,085.

The 11% and 12% cuts were made on the hard-disk XT versions, to \$3,095 for 256K bytes memory and \$3,775 for 128K bytes. The single disk-drive model will sell for \$2,570, and the one-disk-drive model for \$2,575. IBM also slashed the cost by 15% to a hard disk at a list price of \$1,690.

The big question is whether all those PC owners will be the proud possessors of a "blue elephant" or if they will be able to upgrade — replace the Intel 8088 processor with the 80286, which the PC2 is expected to have. Even Moltz, director of Microservices for International Data



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Corp. in Framingham, Mass., said he doubts IBM will facilitate an upgrade because it has shown no interest in being in the board business. "But," Molz added, "I'm sure peripheral manufacturers will come out with boards to turn the PC into a PC." He cautioned, however, that the PC's 3.5 in. disk drives will further complicate conversion attempts.

Meetings of the Mind

Teleconferencing will grow at an annual rate of 34% from now to the end of the decade, from its present \$279 million to \$3.7 billion by 1990, according to Lorne Parker of the University of Wisconsin. Parker made this forecast during

the first transatlantic press teleconference, linking New York with London.

The study involved 1,200 interviews and took two years to complete. More than 200 organizations presently using teleconferencing were surveyed. Of these, 69% have audio rooms, 31% have audiographic or televising equipment; 29% have two-way video and 23% have freeze-frame equipment. The benefit cited most often was savings in time and dollars. Other benefits mentioned were shorter and more efficient meetings, faster response times, improved communications between sites and wider expertise in making business decisions.

One of the fastest growing segments — 35% to 45% annually — was ad hoc

videoconferences, the live programs distributed to hotels, convention centers and offices and commonly used for sales meetings, new product introductions, press conferences and training.

More information on the study can be obtained from the Center for Interactive Programs, University of Wisconsin, Madison, Wis.

Bad News for Computerland

March may have been the cruellest month for William Millard, founder and family-principled stockholder of previously held Computerland.

Computerland, the giant retailer with over 750 outlets and an esti-

mated 1984 revenue of \$1.4 billion.

In two back-to-back decisions by the same jury in Alameda County, Calif., Millard lost 20% of the voting stock in Computerland and 11 other companies and was assessed \$115 million in punitive damages to Micro/Vest Corp., an investment group headed by John Martin-Masucci, who was once employed by Millard. Micro/Vest's lawsuit stemmed from nonpayment of a \$250,000 note taken out nine years ago by Millard with Martin Co., a Massachusetts-based venture capital company. Years later the Martin group offered Millard the note for \$300,000. Millard refused, and Micro/Vest bought the note for \$400,000.

To pay the awards, court costs and legal fees, Millard may have to sell up to 50% of Computerland stock. Barbara Millard, president of Computerland and Millard's daughter, insisted the company will appeal both verdicts and added, "We are not interested in helping Micro/Vest obtain something to which we contend they have no right." Asked whether Computerland might possibly go public, Glenn Odine, the company's chief financial officer at Computerland, stated it was certainly not something they wanted to do.

In Brief

BOSTON — Cullinet Software, Inc. and Lotus Development Corp. recently announced plans to integrate Cullinet's Information Center Management System with Lotus's 1-2-3 and Symphony. Lotus' new product, called Cullinet Symphony Link, will allow users of Symphony to access mainframe data; Cullinet's new product, called Cullinet Universal Link, will enable Lotus 1-2-3 users to communicate with a mainframe from a micro with either floppy or hard disks.

The new products will provide mainframe integration via ICMS, which then allows for communications with mainframe data bases such as Cullinet's JDMS/R and IBM's IMS/AS, DL/I, and also subscription data bases. Each link product costs \$300; ICMS, which runs on IBM's System 360, 370, 4300 and 30 series, costs \$150,000. At present, no places exist for site licensing.

BURLINGAME, Calif. — Honeywell, Inc.'s Small Computer and Office Systems Group (SCOS) will close its operations during four separate weeks in 1985 and reduce its 4,100 work force by 120 employees. The company cited softening in the U.S. market for office systems market as the major factor for closure.

CAMBRIDGE, Mass. — Lotus Development Corp. signed a letter of intent to purchase financially troubled Software Arts, Inc., the Woburn, Mass., developer of VisiCalc. Under the terms of the agreement, Lotus would acquire Software Arts' assets, including the VisiCalc, TKSolver and Spotlight packages. The two Software Arts founders, David S. Brincklin, chairman, and Robert Franklin, president, will also join Lotus.

Until a few years ago, Software Arts was a profitable firm. Its fortunes changed dramatically after a protracted 1983 legal battle with VisiCorp, the San Jose, Calif., distributor of VisiCalc. As a result, Software Arts' revenues plunged to \$3 million in 1984 from \$12 million the year before.

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Wise Managers Fit Software To End-User Needs

By Robert H. Holland

The chief executive officer (CEO) of a large insurance company is having difficulty managing the company's operations. Although he relies heavily on information regarding the company's products, markets and finances, the information he receives is often late, inaccurate and inconsistent — too much data, not enough information. He requests that an executive-level decision support system be implemented.

To his surprise, the CEO is informed that it is impossible to fulfill his request; the necessary data is generated by 30 different application software systems, a third of which are more than 10 years old; 943 software programs (more than 400,000 lines of code) written in three different languages, half of which are more than 10 years old; and more than 400 data bases and files containing data that has been proliferated by application software.

The result of this software potpourri is that 584 reports containing 50,000 pages of data are generated each month. The information the CEO wants is contained in these reports, but it would be a very long time before it could be integrated into a decision support system.

Although the CEO is planning to change the company's direction, he can see the inflexibilities the company faces. New products that are planned will impact the policy writing and distribution systems. The financial information system will have to support constant alteration of the product mix and the market. This is impossible with the existing application software. There must be a way. What should they do?

In another setting, a division director of a large international conglomerate wants to implement a customer direct-order system to help increase productivity and boost profit margins. The director is startled when the management information systems (MIS) manager tells him that, in his own division, they have evolved to 26 incompatible customer application



Figure 1. Levels of Application Software

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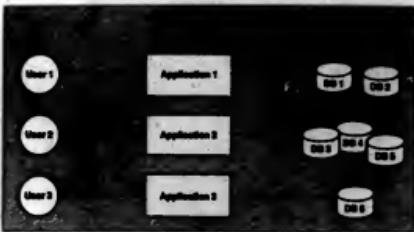


Figure 2. Application Data Base Approach

systems complete with associated data bases and files; four general ledger systems, all running concurrently; 50 employee databases and files; and computer hardware from five different vendors (none of which is compatible).

It won't take long for the director to determine the new system cannot be implemented. Although the technology exists, it will be impossible to tap the application software and its data because of the way they are operating. Something will have to be done, but what?

Every type of organization has new business opportunities and plans that are being hampered in some way because application systems and associated information technology have evolved rather than being integrated into business direction. Today's business, whether it recognizes it or not, has centered the information age. It is no longer dependent upon what before was raw data collection and proper transformation into useful information. New business directions are formed in response to government regulation and deregulation, acquisitions and mergers, foreign and domestic competition, an enlightened customer-base and other factors too numerous to mention. These new directions can have a severe impact on the scope of application software and its development.

Today, the primary difficulty in application software are improper integration and the inability to match applications to current and planned business actions. Figure 1 shows the three levels of application software now being utilized. This figure is not intended to be exhaustive, nor does it contain terminology that necessarily applies to any one organization. However, it does apply in a generic sense to all organizations.

Level 1 applications are the most crucial and the most difficult to align with business direction. Such difficulty arises from two fundamental reasons. First, Level 1 applications are the most numerous. They are the foundation for the baseline

operations of the company. Second, they collect or create most of the data used in Levels 2 and 3. The success of all other applications depends on proper definition and integration at Level 1.

Level 2 applications have limited capability and are either control-oriented or revenue-generating in nature. One example is specialized software for customer ordering of goods such as rental cars, catalog merchandise, periodicals and insurance policies. Level 2 applications depend upon the integrated data supplied by Level 1 in order to provide normal, day-to-day decision-making capabilities. Examples include authorizing customer orders, making pricing changes, adjusting inventory levels, and so on. Level 2 applications will not work unless Level 1 application software is integrated with business plans. Thus, when management wants to do something a different way or to have better control of plants-to-products, they are often stymied by lack of application or information availability.

Application software used for decision support or specialized experimentation is Level 3 software. Examples include information centers, specialized design centers and ad hoc query capabilities. These applications use substantial amounts of data from Levels 2 and 3 and from sources outside the organization. Level 3 software doesn't work well (if at all) unless Levels 1 and 2 are properly integrated.

The three levels illustrate the importance of stabilizing data and applications in order to maintain day-to-day operations and to support business direction. Although application software is only one factor in maintaining successful business processes, it is a very important one.

Within the application software component, we have tended to couple the data to the application too tightly. This is illustrated in Figure 2. Applications have been structured in such a way that the same data is being proliferated through each application. Users are not getting

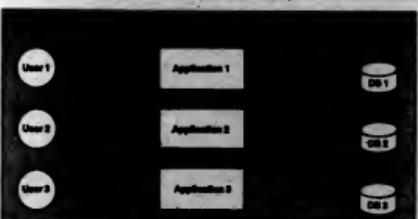


Figure 3. Subject Data Base Approach to Applications

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exactly what they need, and maintaining data integrity and flexibility is impossible. The configuration of lines between users, and applications is rather complex and confusing in Figure 2. Business people don't like this situation; they expect the applications to supply all the data they need. MIS people, on the other hand, don't like reinventing the wheel and building bridges to other applications every time a new business requirement comes along. This application approach has been utilized since the 1950s and is still widely used today.

A solution does exist, and the companies that have adopted it are getting very good results. The solution requires the development of application and data plans based on business actions. Figure 3 shows how this solution would affect the

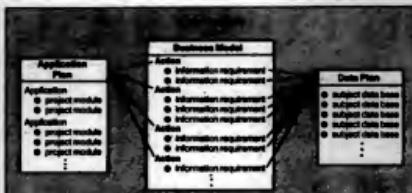


Figure 5. The Intervention Process

three applications from Figure 2. The data bases in Figure 3 are referred to as subject data bases. Each is defined by the

data that refers to a single subject area as well as the necessary relationships to other subject data bases. This approach does

not force various subjects into the same data base purely to meet a single application's requirements as shown in Figure 2. With subject data bases, we decouple the application from the data. Thus, the data becomes more flexible, more integrated and has far more integrity. The subject data bases are treated as an integrated information resource that is available to all applications rather than belonging to a single application. If this resource is to be established, applications must reflect integrated business actions.

Most companies today do not have an integrated picture of their business actions to aid them in the implementation process. This picture or business model identifies both current business actions and planned actions as well as the data required to perform the actions. A formal process for matching applications and data to business actions using the business model is shown in Figure 4.

The resulting data plan identifies the subject data bases necessary to support business actions. The data plan also includes relationships between subject data bases because it often takes more than one subject area to answer a question, make a decision or handle a business transaction.

The application plan shown in Figure 4 identifies all the application systems necessary to support business actions. They are implemented as project modules because they are too large to purchase or develop at once. Each project module has a defined scope and scheduled deliverables and supports specific business actions contained in the model. The common bond between them is the data resource because it must be shared across all applications. This is the framework necessary for efficient project development or evaluation of application packages.

All organizations have a system environment in place. Most have been working at it for more than 25 years and have placed hundreds of man-years of effort into their current applications. Two such companies were described at the beginning of this article. This environment will not change overnight, but now is the time to begin. We cannot afford to throw away everything developed so far. Instead, we must come out of the application system rut in which we find ourselves. We must establish a common denominator between business and systems. The common denominator is the business model.

From a business standpoint, the benefits include greater profit margins, higher professional productivity, business integration where necessary and a competitive edge. For MIS, the benefits are reduced maintenance time and cost, the stabilization of the implementation plan and the ability to respond more quickly to changes in business requirements. Users at all levels will find they are getting what they want and need. When everyone is involved and committed, then the company truly begins to understand the meaning of the information age.

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the network. In addition, the network can be used to implement decision logic. For example, the network can be used to implement decisions such as "if the input signal is greater than 10.0 millivolts, then output a digital representation (bit sequence) of the value." This allows for a wide range of applications (e.g., product identification, process control, etc.). However, the use of the network to implement decision logic is not limited to the above example.

As mentioned earlier, the network can be used to implement decision logic. For example, the network can be used to implement decisions such as "if the input signal is greater than 10.0 millivolts, then output a digital representation (bit sequence) of the value." This allows for a wide range of applications (e.g., product identification, process control, etc.). However, the use of the network to implement decision logic is not limited to the above example.

permitted in any local-area network implementation. Network software is perhaps the most important factor in determining actual network performance; in addition, it is certainly the crucial determinant of end-user satisfaction with and utilization of a network.

Software factors involve two distinct areas: operating system considerations and application packages. The operating system software relates to how the user and the application package interact with the network. The

lease of DOS 3.0, manipulating this information was restricted to assembly language programmers and users of utilities such as the Norton Utilities.

To direct the newly imposed functions, a network program and intelligent interface card were introduced. The interface card contains all of the intelligence necessary to physically communicate over the network, to solve contention problems

(through token passing, collision detection and retransmission or other access scheme) and otherwise to interface with the network. The network program resides above the operating system and, in effect, intercepts the local operating system commands for remote resources or data, routes them over the network to the appropriate destination where the reverse translation occurs and the appropriate

action is performed. Finally, differing levels of responsibility were assigned to the actual application package. In a data base applications, where simultaneous access to a single file may be necessary, it is often left to the application programmer to implement record- or even file-level protections to avoid file destruction.

PC-DOS also poses many problems (most notably its file

handling through the file allocation table) for the would-be application developer. The file application table is read into a computer's random-access memory (RAM) when a disk is accessed to handle subsequent file access. However, if multiple users on a network are accessing the same disk, the actual disk allocation will probably differ from the copy of the file application table each individual

**Network software
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widespread acceptance of the MS-DOS/PC-DOS operating system in the business environment is a mixed blessing. On the positive side, with a widely used operating system a successful microcomputer local-area network solution can, at a minimum, be designed for a single compatible series of hardware using an accepted user interface. On the negative side, PC-DOS was designed from the beginning as a single-user operating system. This heritage has inhibited its development into a networked environment because many of the design decisions in a multiuser environment differ from those in a single-user one. Further, PC-DOS has been criticized for its lack of friendliness, and these user interface inadequacies are exacerbated in a multiuser, shared-resource environment.

Ideally, an operating system would be able to control all multiuser aspects of a network, including resource sharing (printer, disk, modem and so on) and file access and protection. With the release of PC-DOS 3.1, the ideal state has not been reached.

Most personal computer local-area network implementations have been forced to take a three-tiered software approach. The operating system continues to direct single-user-type functions such as copying and formatting. Some file-level protections may also be incorporated. For example, PC-DOS 3.0 introduced the ATTRIB command, whereby files can be designated read/write, read-only and so on. These capabilities have been built into the operating system from its inception, but prior to the re-

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user holds in memory. Thus, steps must be taken to ensure that this does not cause potentially destructive conflicts.

On route taken by some developers who try to reallocate file space on a disk. At best an imperfect solution (it is potentially wasteful of precious disk space), this approach pre-

supposes the user has an idea of the eventual size of a file. In a networked environment, an optimal solution would be for the operating system, the network program or, as a last resort, the application package to force an update of the file allocation table in RAM before any disk access is performed.

Not only are these issues crucial in determining a network's attractiveness to both software

developers and end users, they also significantly affect a network's actual performance. Recent tests have shown that the same network hardware may show as much as a 50% throughput improvement running different network software. Network software is a crucial difference in end users' perception of network performance.

But more important for end users is their applications soft-

ware, an area where issues are not primarily technical but rather those of implementation and business practice (licensing and copyright).

As always, there's the good news and the bad news. First, the bad news. At best, network software offerings are limited and, in some cases, represent a chicken and egg dilemma. Software authors are not interested in writing programs for a limited

market, and end users perceive minimal advantage in networking their personal computers with such limited software offerings. As peripheral pricing falls, fewer users can justify a network on merely a cost basis, so these software offerings become essential.

Ashton-Tate sent a cliff-hanger to the network software market earlier this month with the simultaneous release of Oracle II from U.S. distributor (although the version does continue to be distributed outside where it is apparently receiving a better reception). Ashton-Tate is pinning its mid-term hopes on a version of the more powerful Oracle III, although this product's release date has not been announced. Further dampening the enthusiasm of network advocates is the impression left by Ashton-Tate that their new product will be developed to run only on PC Network and not on the network of 3Com — the current market leader.

Users are fortunate that Ashton-Tate is not the only supplier of relational data base software. Software Connections Co. is the publisher of LAN-Dialect, a popular and widely supported package; and Stoneware, Inc. makes a midrange version of DB Master for both Apple Computer, Inc.'s II and the IBM personal computers running on the Corvus Systems, Inc. One-time network pioneer, the announcement of PC Network has spurred a number of current data base package creators into at least the development stage for midrange systems, although announced release dates have not been made public in most instances.

Although data base applications are thought to be the primary application for local-area networks in large organizations, many small- and medium-size businesses have been extremely satisfied with the midrange accounting systems on the market. Local-area network software developers have also addressed many other application niches, including medical and

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Despite multiuser data base systems, accounting systems and so on, however, some people believe a new breed of software application, specific to local-area network environments, must be identified and developed before local-area networks will have their full impact in the office environment.

If personal computer local-area networks are to be viewed largely as a departmental solution, then for messaging and data sharing, there are ideal network application solutions which would be messaging and dependency. In a large number of office environments, most professionals' communication is with others

in the same department or office. Telephone tag and other forms of missed communications are no less common in the large office environment than in dealings with outside parties. As a result, the electronic mail system is one of the most popular software features of any local-area network. Electronic mail has the potential to enhance office communications — the idea behind a local-area network allowing users get over the behavioral hurdle to electronic messaging.

Appointment scheduling would be an ideal software solution to run on a local-area network. If you have ever tried to schedule a meeting of more than two people, you have some idea of the potential benefit of such a package. Of course, the program's success depends almost entirely on how diligently individuals main-

tain accurate, up-to-date schedules on the system.

Unfortunately, this may be a step slightly ahead of its time. Its success rests on individuals utilizing a computerized system for an activity that has traditionally been a nonprofessional, manual task. Such ingrained user attitudes are slow to disappear. Unlike the spreadsheet, which was a dramatic improvement over previous methods of performing the same task, this scheduling function actually shifts some degree of burden to the professional who did not previously do this task. While ultimately this will prove to be a strength and selling point for local-area networks, such applications will not in and of themselves sell local-area network installations.

Perhaps the thorniest issue relating to software and local-area networks is the area of licensing and purchasing arrangements. Software authors are understandably concerned that an organization might purchase a single copy of a software package and then shoot it around a network consisting of tens or hundreds of personal computers.

Large organizations are equally concerned about the equity of a situation which they are forced to pay the same price for the 100th copy of a package that they had paid for the first. Most don't licensing and purchase agreements adequately recognize a network environment.

For example, here is the exact language from the Software Solutions, Software License Agreement for D



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Software authors are understandably concerned that an organization might purchase one copy of a package and then shoot it around a network of hundreds of PCs.

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Software developers who are aid and participate in the local-area network explosion must formulate workable licensing agreements for multiple purchases. Security arrangements provided by network interface card for PC Networks (serial number in read-only memory or card) should allow inventive programmers a high degree of control over where their program is loaded. This protection combined with an increasing class of end users and the entrance of IBM into the marketplace, should produce a competitive pricing structure in the busier areas.

Network planners are often mystified by the myriad local-area network hardware choices. The oft-cited case in computer hardware selection — selecting software solutions first and only then hardware — should also be the case in local-area networks. Only through software can the true power of any work solution be realized.

Yarmis is a personal computer expert with General Instrument Corp., Clifton, N.J.



market share in a segment they can defend against new or bigger entrants.

Verical markets very greatly in sales potential, size, competitiveness and level of automation already installed. The top vertical markets all offer some potential for future sales depending on need for automation, relative responsiveness to using computers and availability of truly functional application software.

In 1984, the top markets for small systems were financial institutions and personal and business services. That year, the financial community (made up of banks, savings and loans, insurance agents, accountants and auditors) spent about \$7 billion on small systems.

In the U.S., there are about 15,000 commercial banks and 5,000 savings and loans. At present, 22% of all transactions are in financial institutions. From 1980 to 1984, penetration of personal computers and on-line teller machines increased rapidly and the installed base of automated teller machines tripled. Communication links between these remote job entry-type and distributed processing workstations will continue to be an attractive and lucrative application to be provided by vendors. In addition, the potential throughout the '80s for sales into this segment is attractive because of bank demands for accurate and timely record processing, billing and receiving; for data base management; for automatic cash dispensing; and for countless other bank functions.

Investment houses are a relatively new market for personal computers. About 24% of the system 50,000 stock brokers and investment analysts in that market use microcomputers. On-line data base access, financial portfolio packages and spreadsheets are the popular applications. Financial data bases are, by far, the largest revenue makers for on-line services such as Dow Jones, I.P. Sharp, Teletype and Quotron Systems. Increase numbers of brokers are accessing data bases and downloading data right into productivity or analysis packages for manipulation off-line.

Of the more than 420,000 accountants in the U.S., about 40% of them use microcomputers. This market requires comprehensive general ledger programs to balance books and generate reports.

Other popular applications include on-line data base searching to evaluate existing and new law laws or regulations, automated payroll systems, accounting and check writing. Spreadsheets are very popular for analysis of receivables, payables, payroll, inventory and asset management. By 1985, 71% of all accountants will own micros.

At the end of 1984, nearly 35% of the 400,000 insurance agents in the U.S. used a microcomputer in some capacity. These agents are employed by 1,800 major stock insurance companies, 1,000 major property and casualty companies and 2,000 small mutual life companies. Because most insurance agents are independent, they are economically motivated to keep pace with computer paperwork and to do financial calculations for a wide variety of client options. Most of the larger insurance firms have developed proprietary

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systems that will assess risk policies, approve them and then figure rates. Many vendors have developed relationships with insurance firms that act as resellers to their agents.

There are over 700,000 realtors in some 200,000 offices across the country. Penetration of microcomputers into this market has jumped dramatically in the last three years. The percentage of realtors using microcomputers is estimated to jump from about 25% today to about 75% in 1988.

Business and personal services are a large yet diverse and difficult market to reach. Personal services range from barbershops to wedding consultants. Businesses services (for example, public relations firms and advertising firms) work with businesses as customers.

In 1984, penetration of microcomputers into the personal services market was about 5%; penetration is expected to grow to 15% within five years. Funeral homes and cemetery have bought micros more than any other personal services group and, at a guess, 35% of them are expected to use micros by 1988. Few good customized software programs have been designed for the personal services market. The causes of relatively low sales growth rates have been the high cost of selling to these markets; low computer literacy rates; and the tendency of most users in this market to use general purpose, word processing, data base and accounting packages.

Business services are a much more attractive market as a whole. While the needs of submarkets vary widely, most professionals in these companies are white-collar and have a high computer literacy rate. Advertising firms, public relations firms and hotels and motels still demand solid applications programs at a

competitive price. These niches, especially, will enjoy healthy growth over the next five years.

Currently, about a quarter of all law firms use computers to handle a variety of applications (the principle ones being time and billing, information research and retrieval, and records management). Manufacturers, administrators and the accounting/controlling data processing links are not found as often in law firms as in other vertical niches because most law firms are either one-man offices or have very small professional staffs.

Fifty percent of the software used by law firms consists of canned programs minimally altered. Programs specially designed for legal applications account for 30% of the purchased; the remaining 20% consist of canned programs with major alterations.

The applications of software differ between large and small firms. For large

About a quarter of all law firms use computers to handle a variety of applications; 50% of the software used consists of canned programs minimally altered.

firms, the area of market opportunity is legal research, either from external on-line data bases (such as Lexis and Westlaw) or from internal files. The design and installation of data base retrieval systems—the principle element of computerized library support—is becoming competitive for those firms targeting the large law firms. These law firms favor having a legal systems house customize software for in-house use. Medium-size firms are more interested in service business for litigation support, which affords maximum flexibility should case-load, from time to time, vary considerably. Smaller firms rely on off-the-shelf data bases and client accounting packages and appreciate faster, cheaper, access to commercial on-line data bases.

Considering the value of a lawyer's time, the complexity of the paperwork, the efficiencies derived from a computer and decreasing computer costs, the market still offers potential to small business computer vendors. However, over the next five years, sales growth will level off as saturation is approached.

The health care market remains a high growth area. Presently, about 10% of all physicians, 5% of all dentists and 30% of all hospitals own computers. Penetration of micros among physicians has increased rapidly over the past three years. This trend will continue as more doctors witness the decrease in office expenses through automation and as more young medical students living to their practical computer literacy acquired in school.

Physicians use micros mainly for billing and claims processing. Other applications include patient recordkeeping and doctor-divided software designed for specific medical practices such as drug stores and pathology test evaluations.

There are two major applications within a physician's laboratory, namely, diagnostic-related group (DRG) data and

physicians' offices. The lab area covers technicians who use sophisticated equipment and automation for recording and inventory, sampling and statistical reporting. Pharmacists are also major users of inventory systems. However, many small hospitals continue to use manual procedures. Over the next few years, nearly every hospital will require a system to correlate DRG data to reimbursement from insurance groups.

Of the 120,000 U.S. dentists, today, only about 4% use micros. By 1986, it is estimated, more than 50% of all dentists' offices will be automated. Dentists, burdened by high overhead and substantial capital equipment, typically welcome any means of reducing overhead.

In the building market, only 7% of all general contractors have purchased com-

puters. Acceptance has been hampered by the large number of individual contractors and a lack of computer literacy. Penetration of micros will increase as computer costs decline and literacy rises. By 1986, roughly 22% of all general contractors will own or lease a computer. Architectural firms will be very receptive to cost considerations. About 50% of all firms have at least one computer, and an estimated 85% will have one by 1986.

Several types of software are critical to the contractor or architect: general ledger, project management and scheduling packages. The general ledger programs separate jobs by job cost and allow accounting for subcontractors. Project management packages, essential for computing estimates of proposed jobs, allow easier and more accurate bidding.

accounting for ongoing projects and estimating completion costs for jobs in progress. Scheduling programs aid in job costing analysis, bidding, staffing and keeping control of resources.

The agriculture market, while small relative to several other vertical markets, has high potential. The percentage of farms with microcomputers will increase from 5% in 1984 to 25% in 1986. There lies ample opportunity for computer vendors and resellers who know specific problem-solving applications and can reach the frequently remote farmer with cost-effective means.

Partners have embraced computer technology as they have many other

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mechanized farm functions. State fairs now regularly feature computer exhibits placed next to new tractors and prime livestock. About 2.4 million farms exist in the U.S., with more than 3.7 million employees. These farmers, faced with very thin margins and high volumes, have increasingly turned to computers for better inventory and financial controls, specialized accounting and precise up-to-date market conditions.

By the end of 1984, 8% of all farms possessed a microcomputer. Up to 1983, Apple and Radio Shack Model 80s dominated the farm market; IBM is now gaining in share, with more and more application software being written for it.

Farmers spent an estimated \$210 million on microcomputer systems in 1984 and will spend an estimated \$325 million in 1988, when roughly a quarter of all farms will have microcomputers.

Finances and bookkeeping are probably the single most important farm application. Single and double entry, cash-based bookkeeping systems are very popular, such as those offered by AgriStar Computer Systems, two leading vendors. Livestock management requires separate application packages because swine, poultry, cattle and dairy cows each have their own peculiarities. Crop management packages allow farmers to keep track of what was planted, the yield, rainfall, insect counts, soil-test results and fertilizer and pesticides; they also help

farmers experiment with various combinations to yield the best results.

Another vital application is linking up the communications networks via file data bases generated via personal computer and modem. In a business where prices fluctuate frequently, current information is a key factor in providing a profit or loss. For example, Agridata Resources, producer of AgriStar, one of the leading agricultural on-line data bases, offers private and public commodity news, weather service, agricultural-related news and reports, farming strategies and farmer charts on market data. The Harris Electronic News, a Videotex data base, and some 20 other data bases are also geared to farmers.

Other less conspicuous, yet important markets include transportation, wholesale and retail, schools, government offices and manufacturing plants.

A large concentration of mainframes has remained in the transportation market, but it is increasingly being penetrated by small business computers. There are majorities of firms in the transportation business are small businesses or sole proprietorships. Presently, about 85% of them are using manual systems to do billing, inventory, route schedules and other accounting functions. By 1988, 35% of this market is projected to be computerized.

Wholesale and retail trade are almost horizontal markets. Thousands of varieties of goods are sold through these businesses. Many of the computer needs are similar: billing, inventory, point of sale and other accounting functions. Presently, about 5% of wholesalers and 2% of retailers are computerized; within five years these numbers should reach 30% and 15%, respectively.

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Elementary, secondary, vocational and university institutions all have been penetrated by microcomputers. In higher education, especially among colleges, computers per student promise to be higher than in elementary or secondary schools. Many lower-school computer purchases are still limited by lack of enough good software, lack of coherent networking strategies by application software publishers and lack of adequate budgets. Computer expenditures by schools are expected to go from \$2.8 billion in 1984 to more than \$3.8 billion in 1988.

Among manufacturing operations, average computer expenditure per manufacturing site is high because of the high cost of robotics, mainframes required to operate a plant and other factory automation equipment. In 1988, more than \$3.8 billion will be spent by this market for all types of computers, large and small. The value of microcomputer-based systems sold to this market will total about \$1 billion.

Government institutions and offices (federal, state and local) spent nearly \$400 million in 1984 on small business computers. This market is also expected to enjoy continued healthy growth.

Whatever the market, computer vendors will have a good chance of succeeding if they keep focused, listen closely to the individual needs of the market they are serving, distribute products through a cost-effective distribution scheme and line up with other players offering complementary products or distribution channels to reach that particular market.

Velonis is president of The Jupiter Group, a San Mateo, Calif., market research and management consulting firm specializing in the microcomputer industry.



PC Software Support: Low Profile, High Stakes

By Tom O'Flaherty

Software maintenance has always been an activity people performed in secret. The goal of in-house maintenance is to do as little as possible, and it is not surprising that (unless things go wrong) maintenance has both a low profile and a low status in most organizations. Mainframe-software vendors value maintenance a bit higher than others do because for them maintenance is a continuing revenue stream. Nevertheless, even they believe glory and growth lie in developing and marketing new products.

Against this background, the low-key operation that characterizes support activities for personal computer software is not surprising. We can all be happy that the days are drawing to a close when

personal computer software support was strictly caveat emptor — no address and no telephone number would be found in the package. Many personal computer firms still bear traces of this past attitude, but now its status has become more socially acceptable: "If we test our product well and have good enough documentation and on-line aids, we'll never have to actually talk to a customer."

This vendor attitude was often acceptable (perhaps even half-desired) by early users who had a hands-on, macho attitude toward micros. Alas, the days of the giants are passing; most users now need all the help they can get. The question seems to be where that help is going to be found.

The problem with talking about

help for personal computer users is that several almost completely separate types of use and users exist. Defining corporate needs is no easier than defining the needs of any other group. Those needs are highly variable; a wide selection of software is often used; there are many casual users; "personal" personal computer use is declining; and departmental, or even corporate, needs are increasingly dominant.

Another problematic area is that of micro-mainframe links and their effects on software support at both the personal computer and the mainframe levels. Although this very specialized and demanding area of support will dwarf stand-alone and locally linked personal computer software support

in several years, it is a current concern in only a few organizations.

It is just as well that most organizations do not yet have to concern themselves with micro-mainframe software support. Most organizations still have a great deal of unfinished business in the area of personal computer software support. These organizations are confronted by a wide range of support services: fixes to packages (often referred to as maintenance), enhancements to packages, training, providing custom personal computer software and consulting.

Fixes. Fixes — which are the way mainframe software has been maintained for years — are becoming much more common with personal computer packages.

However, many personal computer software vendors still seem to think they are publishing hardbound books rather than a loose-leaf service; they don't normally consider supplying fixes.

Many others that do provide fixes view their activity as a service that probably helps future sales rather than as a business. This attitude tends to reduce the value of the function to the corporate user who is generally more than willing to pay a reasonable amount for the service.

Enhancements Vendors now typically add functions to a package by coming out with a new package. The new improved package may be compatible (up to a point) with the previous package, and prior purchasers may or may not receive a discount on the new package. Involvement in new products also occurs in the mainframe world, but for less frequently. Mainframe software vendors are more sophisticated and understand an ongoing enhancement program is a win-win situation for themselves and their customers.

Training The need to train people how to use particular packages as well as how to use personal computer software in general is obvious. Somewhat surprisingly, however, training has not yet been offered on a large scale or in an organized way. Except for traveling seminars and local computer stores, training has been a cottage-industry. It will be interesting to see what impact the recent Computerland decision — to supply its name to franchised training centers — will do for this market.

Custom Personal Computer Software Discussing customized software may broaden the category of software support beyond its usually defined limits. Although this is no doubt true from a vendor's standpoint (software vendors usually avoid customizing software), the same sense of "no divide data representation" is the common standard. In general, customers would like an overlap between personal computer systems design, standard packages, customized packages and customized personal computer software development. Because of the extreme youth of most personal computer packages aimed at specific applications, the plain vanilla version of those packages is even less likely than mainframe packages to meet legitimate business needs. The need for modification rises to an almost certainty when there is also a need to interface with a mainframe system that, likely as not, may be a custom system itself.

Consulting A multitude of activities — helping to establish

a personal computer strategy for a department or corporation, identifying functions that should or should not be carried out on a personal computer, matching specific computers to user needs, setting up a personal computer monitoring process, assessing costs and benefits of personal computer software applications and so on — can be covered in the consulting area.

Support Currently, it is

much easier to describe the kind of support that should be supplied than it is to specify what sort of support is available or where to find it. The unfortunate fact is that for many organizations the principal source of support is "none of the above;" other suppliers are the package developer, a dealer or other reseller, a professional services firm or the customer organization itself.

Development Many software developers have moved from the stage of giving no support to one of at least supplying package fixes. As noted earlier, often these fixes are not provided on a businesslike basis. Few alternatives exist when this kind of support is not adequate for a specific package. Customers will have to be patient or seek out large firms with a mainframe orientation toward support. However,

the recent saga of Peachtree Software, Inc., shows even this approach has its defects. There will be an even longer wait until many developers get into the enhancement business, which requires a longer view and more business maturity than most have, as well as a significant business base and cash flow.

Conclusion At first glance, dealers could appear to be the logical focal point for providing



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many types of after-sales service. So far, most dealers have not gotten involved. The computerized training offered will even be limited to standard training. At this point dealers do not see themselves as having the skills to offer these kinds of services. Vertical market specialists are an obvious exception to this statement. One school of thought says that many dealers will be able to survive only by be-

coming specialists. It is doubtful whether many will be able to make the transition.

Salesforce Phase: Professional services organizations are taking up much of the slack for after-sales service (training, customizing - and consulting). Although some large mainframe-oriented firms have become involved, after-sales service has been provided mainly by very small organizations, many

of them run by early personal computer enthusiasts who have made a business of their hobby.

There is a perceived need for these kinds of services in many organizations. However, these organizations are often frustrated in their search for a supplier. In addition, very large organizations often find it uncomfortable to work with very small organizations. In this sense demand exceeds supply.

Self-Support: More through circumstance than intent, many customers now provide much of their own support, especially in customizing and consulting. This tendency should decline somewhat as professional service firms' offerings become better known and their skills become more differentiated.

As corporations become better acquainted with specific packages, they can develop or-

ganization-specific training in such things as terminals and applications interfaces. In some cases it would make sense for the corporation to modify a personal computer package to meet a specialized need.

Strategies: The most important strategy is to have a strategy. If an organization is able to learn from its mistakes; even a bad strategy is better than none.

At the least, the composition of each support function must be identified and categorized by suppliers selected. This set of decisions could, for example, influence which personal computer or software products are used.

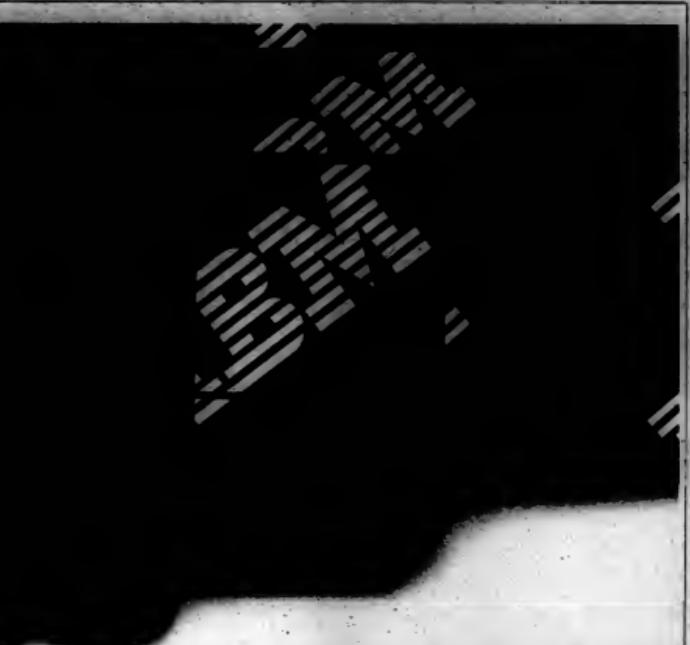
Although a high discount is often the primary goal when an organization negotiates with personal computer software vendors, it should now be obvious that support or enhanced support may be even more desirable than getting the last 10% discount. Support arrangements include agreement on the vendor's correction cycle and enhancement policies, access to the vendor's data base of problems and solutions, a special hot line and a national users group.

Large customers may make the provision of high-quality support more attractive to responsible software vendors by relieving the vendor of routine but expensive tasks. A corporation can set up an internal support group that fields repetitive questions from personal computer users, passing on to the vendor only the rare or difficult questions. The internal support group would also have access to (perhaps a subset of) the vendor's internal data base of problems and solutions.

Consultants: Personal computer software consultants will be a very difficult but potentially highly rewarding activity. Much of the difficulty arises from the following multidimensionality of the personal computer software support function:

- Internal vs. external support.
- Vendors vs. MIS professionals.
- End users vs. MIS professionals.
- Product multiplicity.
- Full-time department employees where part-time users.
- Centralized vs. decentralized personal computer environments.
- Technical users vs. non-technical users.

A personal computer software approach that satisfies most of these constituencies will take time to develop. It is almost certain that such organization will evolve its own solutions.



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The Blitz Approach To Requirements Analysis

By John F. Palmer

After frequent slipped deadlines and reestimates of remaining work, many project teams find out too late that the requirements analysis work they still have to do can't be done in the time they have left. Faced with this time squeeze, they either skip directly into system design and implementation — ultimately producing an unusable system — or the project is cancelled by an impatient upper management. In each case, precious systems development resources are squandered.

To avoid this problem, project teams can use a technique called blitzing, which will identify the time and person-power necessary for requirements analysis before a project starts. Blitzing is the rapid development of representative

portions of a requirements specification by a special group of systems development professionals. Project teams should put special emphasis on blitzing logical requirement specifications because the analysis and specification of logical or essential requirements — inputs, outputs, stored data and processes the new system must carry out, regardless of the technology used to implement the new system — consumes most of the time spent in systems analysis.

From a technical standpoint, blitzing is a three-part process that produces the following:

- A high-level essential model of the existing system being renovated by the project.
- Detailed models for selected essential activities identified by

the high-level model.

• Time and person-power projections for completing the essential model.

Models produced by blitzing are built with the tools of structured analysis. The process uses the essential requirements framework and partitioning strategies of essential systems analysis.

The mechanics of holding a blitz are important. Blitzing is a team effort led by a facilitator who understands the techniques. A typical blitzing team will contain the project manager and representatives from the project team, user management, management information systems management and data administration. The blitzing meeting is held in an isolated location where interruptions that

would slow productivity are minimal, and the meeting can be as short as a few hours or as long as a week. Sufficient conference support, including audio-visual support and food and beverage service, should be available.

First-time blitzers do better when the blitz is preceded by a short training session on techniques and objectives. Training should include several blitzing simulations to let the novice acquire some skill in the techniques before the meeting.

Blitzing a high-level current essential model — the first step in the three-part process — starts with the construction of a context diagram based on the blitzing team's informal understanding of the project's scope. This diagram

identifies data flows inputs and reports) that will separate the new system from the rest of the organization.

These inputs and outputs, along with other information about the new system, are used to identify business events to which the new system should respond. As the team constructs and reviews a list of these events, scores of events the system must respond to may be identified. In the process, the team must identify and record various project constraints, for example, the extent to which the project could change other systems.

At this point, the team informally defines system inputs and outputs. The definition usually consists of finding a form, report or screen layout that identifies most or all of the data elements contained in the input or output. An informal data dictionary and data definitions is set up to serve as a reference for the rest of the process. The inputs and outputs also serve to identify entities the system must keep data about over time. These entities are identified as the data element content of the system inputs and outputs are reviewed. Data elements that describe each entity are listed in the definition of an object data store named for the entity. These definitions are kept as a reference in a separate informal data dictionary.

Next, inputs, outputs, business events and entities identified so far - the blitzing process are used to define the individual business functions — the essential

Blitzing gives management a basic understanding of a process that typically will take up a significant share of project time.

activities — of the existing system. An essential activity model — comprised of a simple data flow diagram that shows the single essential activity connected to the appropriate system inputs and outputs and object data stores and a high-level procedure definition for an activity — is created for each entity in the system.

When the blitz is done, the high-level current essential model will consist of five component pieces: context diagram; data dictionary of system inputs, outputs and data stores; list of events the system responds to; set of essential activity models; and list of constraints identified during the process. These products will ultimately provide a base for a complete current essential requirements model. However, before trying to complete the model, the blitzing process requires a projection of the effort required.

The high-level model, alone, is not sufficient for projecting resource requirements. Detailed analysis — the second

step of the blitzing process — must be done on three or four representative essential activities to probe the difficulty of detailed analysis. A projection of resources to finish the current essential requirements analysis can be made from this.

Unlike the blitzing, the detailed analysis probes are carried out in working conditions similar to those that will be encountered by the project. The work is not done by the blitzing team but by the technicians and users who will complete the detailed analysis after blitzing has been completed. The same quality assurance measures normally carried out during detailed analysis are carried out to verify the work done on the probes.

The main resource measured by a probe is the person-time required. Any探子 participating in a probe keeps a detailed record of how time was spent. At the end of each probe, these records are collected and analyzed. When all probes are complete, the results are used to project total resource requirements for finishing the current logical model — the third step in the three-part process.

The probing process proceeds in the same way for each essential activity selected for analysis. It starts with a confirmation of the interfaces an activity has with systems outside the context of the project. When the confirmation is complete, detailed process descriptions and stored data requirements must be defined.

To obtain the system knowledge to produce these model components, the probes trace the activity's context interfaces backward and forward through the existing system. A record is kept of logical features from aspects of the system considered technically independent are ignored. This record is kept, using the tools of structured analysis.

When the traces are complete, the logical features found are reformulated to remove subtle false requirements such as unnecessary stored data accessors mandated by file storage constraints. During this process, data flow diagrams, process specifications and data dictionary definitions produced by the trace are consolidated and restructured. The result is a structured analysis model of the essential activity that was the subject of the probe along with a time sheet for the probe. When all probes are completed, the blitzing team is re-formed to analyze the results. Rough projections can be made from straight-line extrapolations of resource requirements during the probes over the whole context of the project.

More precise projections result from a two-part process. In the first step of this process, the original blitzing team reviews all aspects of the models produced, the process used and the people involved, to identify factors that would lead to bias and projection. The team looks for these aspects of essential activity model-

ing that took the most time and discusses the likelihood of finding similar difficulties in essential activities not yet analyzed. In the second step, based on the projection bias analysis, a carefully designed resource projection formula is established. Weighting factors are used to modify the straight-line projection formula, to adjust for biases found.

Changes are made in resources available or in the scope of the project to bring these into line with the projections obtained with the blitzing process.

Blitzing has three direct benefits:

• It informs project management of the extent of logical requirements definition work to be done during the project. If resources are adequate, the project should proceed as originally defined. If the resources needed for logical requirements work exceed the capacity of resources available, then the project must be canceled. The technical work of developing the model is the creation of a series of projects, such as producing a usable system. If a series of projects is considered, it is wise to plan to produce a usable system every two years. The likelihood of a project cancelled increases enormously for projects that go on for significantly longer than two years.

• The blitzed logical model can have an effect on requirements definition when it is under way. Many analysts and users have never seen a logical requirements model. For them, the blitzed model is a valuable, if incomplete, example of what the logical model will look like.

• The probing process in blitzing is the procedure used to complete the rest of the current logical model. The blitzed process is very different from the traditional structured analysis approach to building a logical requirements model.

The biggest single difference is in the amount and type of current physical modeling — documentation of how logical requirements are currently implemented in the existing system. Many projects using traditional structured analysis waste a lot of time modeling these features. The probing portion of the blitzing strategy minimizes the current physical modeling work necessary to build the current logical model.

Blitzing also has some indirect benefits. It encourages direct participation of technical and user management in the project planning process. It also gives management a better understanding of a project that typically will take up a significant share of project time. In addition, blitzing helps encourage a spirit of teamwork. Finally, it helps make upper management aware of some of the difficulties associated with identifying and defining the business policy that must be implemented in the new system.

Blitzing helps control the process of applications development by projecting the resources necessary for requirements analysis. When projects have sufficient resources to do requirements analysis, a major reason for project failure has been removed. Because failed projects not only waste the application's funding but also resources that could be used for other purposes, a small investment in blitzing can have a large effect on the application's success.

III

Palmer is one of the founders of The Atlantic Systems Guild, Inc. in New York and is coauthor of *Essential System Analysis* (New York: Yarsen Press, 1980).

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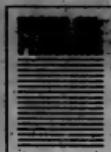
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How MIS Managers Handle Applications Software

By Lee White

O

ne manages a data processing department of 30. Another shares management responsibility with a second senior vice-president, and the size of their total department is over 500. A third, whose organization touches the pocketbook of every U.S. citizen, uses no mainframe at all; that case is balanced by a fourth whose installation has "a bunch of 3080s and 4300s." Five of them, together, are either using or testing or have already discarded almost every microcomputer and mainframe application software package known to modern man; one is using no query package at all.

As different as these DP managers, directors and vice-presidents are, they have more in common than is immediately apparent.

What they share is amazement at how far the field has come and concern mixed with excitement over what may happen tomorrow. *Computerworld Focus* spoke with these six DP executives to find out how mainframe and microcomputer application software has changed the way their companies do business.

What we found was more than we were looking for. Much has been written lately about how DP managers and their staffs should leave behind their ivory-tower existence and speak to the masses. The people who were interviewed have done just that, and not one is unhappy the old days are gone forever. They reported optimism and success in the spread of end-user computing and reported little

change in applications backlog. However, one manager noted that more projects were submitted as users gained confidence in his user-friendly DP department. None of the managers reported that the percentage of their software budgets had increased significantly, even with the new areas they were branching into.

Jerry Murchie is chief of the information section, U.S. Internal Revenue Service (IRS) Consulting Services Branch in Baily's Corner, Va. Consulting Services is charged with supporting end-user personal computing and has nothing to do with assessing or collecting taxes, processing refunds or performing audits. His division employs about 63 people during peak times; the rest of the year the

staff numbers about 48. These people support all 63 district offices and seven regional offices in addition to national office functions, Murchie said. The end-user community is using micros that tie in to minis, primarily Zilog, Inc.'s Model 31. Because the IRS deals primarily in numbers, Murchie's group has settled on a few software packages — Ashton-Tate's DBase II, Sorcim Corp.'s SuperCalc and Lotus Development Corp.'s 1-2-3 — that fill the needs of their agents. Murchie is particularly interested in expert systems and his group is testing a number of packages, including Intelligent Terminals Ltd.'s Expertise. Murchie said these systems are both natural progressions and enhancements to what his group is now

doing. He does, however, anticipate problems with memory limitations of the microcomputers. "The even greater problem is finding the experts to program the packages," he said. "In the old days of the pen and pencil, we used to make five errors an hour," Marchie joked. "Now we can make 5,000. I say, 'What have we done? We've created a monster.'"

Another person trying to avoid creating an out-of-control monster is Bill Tibbits, staff vice-president of the Information, Office and Data Systems Department at the 30,000-employee Whirlpool Corp. in Benton Harbor, Mich. Tibbits has chosen to take a more cautious posture before introducing micro terminals at Whirlpool's knowledge workshop. Whirlpool is using Colinet Software, Inc.'s applications generator ADS/On-line principally for program development in the manufacturing applications area, but no significant query-type software is running on the mainframe at present. Micros are being used extensively, and other packages in widespread use are Lotus' 1-2-3, Condor Computer Corp.'s Condor as a data base package, Samarc Corp.'s Samarc for word processing and Harvard Associates' Harvard Project Manager.

Mainframe data access is only in the test mode at Whirlpool, a move Tibbits doesn't see changing in the near term. "We are forcing [our users] to enter the mainframe manually at this time. We have a nationwide network, and we just have to make sure we have that under control before we let it go."

Tibbits' cautious posture was echoed by most of the DP managers, with the notable exception of Roger J. Canuel, director of management information systems (MIS) at Elco Housewares Co. in Franklin Park, Ill. Elco employees with appropriate security clearance are able to update some files and they have assumed responsibility for the files, he said. "I have people on my staff who still feel they are the brokers or custodians and that no one should change the files except us."

Canuel, who disagrees with these sentiments, explained. He contends that this new situation is really no different from former times when users submitted a request to change a file. Although no one is verifying that data input is correct when the user keys in the information, no one really did before either. The only difference between the old method and today's method is that "we don't see a piece of paper," Canuel said.

However, such easy acceptance of user involvement is not universal, according to our participants. Chuck Corley is manager of corporate manufacturing systems in the Information Systems Department at Memores Corp. in Santa Clara, Calif. Memores is a billion-dollar company that produces memory as a percentage of sales at about 2.5%. Among other pieces of hardware, the company has "more than a couple Amstrad Vile and some 3036s and 4341s," according to Corley. Although some of the hardware supports manufacturing, the corporate systems budget alone approaches 1%. Approximately 150 people function as support staff for the corporate effort.

Some of Memores' user community — especially those with access to micros and minis — no longer use the systems group to get jobs done, Corley said. With the user-friendly attitude created by the DP department, users have bypassed traditional paths and now "we've lost the opportunity to get a real accurate close loop," he added.

Doom and gloom, however, were rarely voiced by survey participants. This attitude was a contrast with that of a year ago when DP professionals were adopting a wait-and-see stance. Although products were available, they were often cumbersome to use. This hampered white-collar workers' efforts to bridge the micro-to-mainframe gap. Today, according to respondents, good products are there in multiples; only one of the group said product quality has a long way to go.

Roger M. Menar, senior vice-president of computing and communications at Carter Hawley Hale Stores, Inc. in An-

chorage, Calif., has more than 200 people in his department and more than 220 staff members on the development side. These two divisions support approximately 65,000 employees and 9,500 terminals throughout the U.S. and Canada. To support what Menar terms the "exploding marketplace" of available products, Carter Hawley Hale has a separate group to work on technology on a research and development basis.

Not only were the surveyed managers optimistic about the increased sophistication and user-friendliness of the new software, they also expressed confidence in staffing for user support. At Whirlpool, for example, although internal transfers into the systems department account for much of the hiring, some of the best DP knowledge exists within user departments, according to Tibbits.

The executives also strongly agreed that the microcomputer is gaining strength in the business world now that effective micro-to-mainframe links are available. Carter Hawley Hale presently has about 500 microcomputers, and Menar expects that number to double by the end of 1985 and to continue to double for some time to come.

Menar's group, which includes end-user computing, has an impressive array of software available for the mainframes and minicos and is using Information Builders, Inc.'s Focus and PC Focus as the linking software for personal computers. Cost is the only thing stopping them from proliferating of PCs, he said. In the meantime, Menar has to add an IBM 3270-type terminal in order to access mainframe-based application packages. When microcomputers become a more financially feasible solution, he continued, all the dumb asynchronous terminals will be replaced with micros.

Another Carter Hawley Hale plan is to dedicate one of its 3083 mainframe computers to IBM's Professional Office System (Profits) which will then serve as a delivery mechanism for all data on the system. The company settled on Profits because it is user-friendly, Menar explained.

The methods employed to support end-user computing in the various companies in the survey varied as the hardware and software choices. Perhaps the most exciting and surprising comments, however, came in the area of perceptions: How users perceive the systems group, how systems professionals have adapted to wholesale end-user computing, how systems executives perceive their jobs today and how those jobs may change tomorrow.

Canuel said he has noticed a considerable change in the way users now perceive the systems department. "We were very much maligned long ago, and that was because we were not able to respond to the users' needs." He added that the perception of MIS has improved because users have assumed responsibility for the accuracy of their own data.

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Tibbitts said he has also seen a change, but thought the change could be attributed to an active effort on the part of systems personnel to effect the change. Tibbitts explained that a "philosophic" stance has been taken at Whirlpool. "We have tried to establish the point that we cannot run other people's departments better than they can. There is a tremendous amount of input needed from the user community. We work with them in developing the systems that will give them the support they need."

Perhaps part of the reason user-friendliness and user-responsiveness are keywords these days comes from the very top of the systems organization. Paul, from Atchison, Topeka & Santa Fe, not only came into the systems department from the user side four years ago, but came from the executive level, where he was in charge of strategic studies and the corporate plan. Prior to that he was involved in research and industrial development, and before that he was general manager and vice-president in one of the regional offices. "I think I'm user-oriented, and I've had as my major objective making this department more user-oriented," he said.

User orientation has been a struggle for many of the surveyed DP executives. Most head departments with many long-time DP employees who have found the transition difficult. But each of these executives said the the transition was made, and the DP employees are pleased with the overall result. Murchie, who has been with the IRS for more than 25 years, was hired the longest term employee. He showed obvious enthusiasm for the user community he services. "I've tried to keep my eyes and ears open and to stay attuned to what's happening. If things have been difficult in the past, don't carry that preconception into today's setup," Murchie advised. He insisted that had his group allowed these preconceptions to overshadow the big picture, they would never have gotten as far as they have with end-user computing.

Menar also admitted to some attitude problems on the part of long-time systems department people, but only in the beginning. "We've adopted an attitude that first and foremost we are business people. The only reason we exist is for the purpose of business and selling merchandise at a profit." Menar said. Hawley Hale has sent many people to graduate programs at Harvard University and the Sloan School at MIT. The message these employees impart upon their return is that the traditional data processor is not going to survive without reeducation. "We need to pay attention to the user community," Menar explained, "and we're really trying to do that in a big way through an overall education program. We like to think we're doing an OK job."

In general, there appears to be little doubt that the executives surveyed and the people these executives supervise are doing a better-than-OK job. Five years ago, most people employed at the companies surveyed for this article never had touched a computer. Now, according to survey participants, computer activity has increased dramatically. And the excitement evident in the words of these people is testimony to a successful transition.

Even more evident is the anticipation directed toward the next five years. Paul

saw microcomputers playing a bigger role in the future of business computing. "I think [the advent of] micro is one of the greatest things that has happened not only because [the users] can control a lot of the things they do, but I think it's forcing the information systems departments to be more user-oriented." Paul voiced high hopes for expert systems and artificial intelligence and predicted that such approaches will radically change the future.

Whirlpool's Tibbitts observed that he sees his job changing as he works more closely with top management, and he is finding that management is able to establish and verbalize its needs. "This gives [a project] more clout and we, in turn, are putting in systems that better meet the users' needs as a result of that clout."

Tibbitts said,

"Most of the participants gave little credence to the concept of fifth-generation languages, preferring to stress that fourth-generation languages still have a way to go. Causal from Eckel Housewares was one of the doubters. "Despite what the vendors are saying, fourth-generation languages are not being used by the users. I think some more user-friendly languages will be coming out." Menar didn't see it quite the same way. Carter Hawley Hale's corporate strategy, according to Menar, is to move immediately to as many people as possible. Menar's group is presently testing Artificial Intelligence Corp.'s Intellicell and hopes to have the product up and available to a large number of people through Profs by the middle of 1985.

To a person, though, the surveyed executives stressed the need to regard data as a corporate asset. Some, like Carter, worried that this very important asset is being abused. Others, like Menar, recognized a potential for abuse, but said it was a management issue rather than a systems issue. Menar stressed there must be a control mechanism, and management must take the responsibility to put that control mechanism into place. "If you were dealing with sheaves and calculators, you'd have a similar problem. Simply because it comes out of a printer off a computer doesn't mean it's the gospel truth," Menar summed up.

White is a senior writer of Computerworld Focus.

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By Norman L. Agin

Personal computers are increasingly used for serious data processing applications that go beyond the decision support functions satisfied to date by programs such as VisiCalc and Lotus Development Corp.'s 1-2-3. This trend has major implications for designing the next generation of data base management systems. Until recently, personal computers were used primarily for decision support or ad hoc light duty managerial applications generally undertaken in support of an analysis. A common example is the use of a personal computer by senior management or staff to make budget projections or calculate financial returns. The principal program originally used for decision support was VisiCalc, Context Management Systems, Inc.'s Context MBA and Lotus 1-2-3 introduced a second generation of higher performance spread-

sheet programs offering more advanced features. Now decision support users can choose from Lotus Development Corp.'s Symphony, Ashton-Tate's Framework, Ovation Technologies Co.'s Ovation and a host of other new-generation software packages.

In contrast, DP applications involve routine file processing; are often clerical or operational rather than managerial; and concentrate in the areas of information maintenance and reporting, not decision support. DP applications — order entry, personnel recordkeeping and other production applications that neither require nor can be economically justified on a mainframe — are more traditional uses of computing. Developments in computing have led to the increased use of personal computers for DP; among

Information workers' needs will be met only if computing consumers are able to develop their own applications without relying on computer specialists or MIS. The number of specialists cannot meet applications development demand.

those developments were faster personal computer processors (for example, the 8086 chip), lower-priced fixed disks and

improved software. DBMSs are available to support the needs of DP users, but most are not satis-

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factory. If the needs of this fast-growing sector of the market are to be met, hardware and software changes are needed, specifically:

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Over the next decades, many of the 50 million information workers in the U.S. will become computer users. Phones, typewriters and calculators will be replaced by desktop computers in one form or another. Applications not economical for mainframe computers will be implemented on personal computers. Furthermore, many of these applications will be customized to individual requirements.

Information workers' needs will be met only if computing consumers are able to develop their own applications without relying on a computer specialist or a corporate management information systems (MIS) group member, except perhaps in a central staff support role. The reason for this is simple: the number of computer specialists cannot meet the demand for application development.

The two basic types of users. Some DBMSs were designed principally for computer specialists to use in developing applications for other users; other DBMSs were designed for end users to utilize for their own needs. For the most part, the former are syntax-based, nonprocedural languages and the latter are menu-driven. This distinction should disappear and, in fact, has already begun to do so. The future success of specific DBMS products will depend heavily on their ability to satisfy both markets. They must be powerful enough to satisfy the needs of computer specialists while at the same time easy enough to use to let computing consumers design or modify applications.

One way to produce this dual-purpose product is represented by menu-driven DBMSs that also provide for menu-driven menu design, catalogued procedures and command file operations. Catalogued procedures are applications that can be given a name and executed whenever desired by entering the appropriate name. Command files contain sequences of keystrokes and catalogued procedures and are executable by name. Command files are automatically created the first time by saving the keystrokes that respond to menu prompts or call catalogued procedures. The computer specialist can use these features to customize an application for novice users. At the same time, menu prompting gives end users an easy way to design their own applications.

The area of DBMS interfaces definitely needs improvement. Not only are interfaces and almost no user interfaces needed, but also new criteria must be established for measuring and judging the value of these interfaces. The end-user interface — the way users communicate with the computer — can be thought of as the front-end

to a DBMS. Major options include keystrokes, telling or touching.

Improved keystroke interfaces will continue the evolution that started with natural languages and has evolved through nonprocedural and natural languages. Programming languages such as Basic or Cobol tell the computer what to do and how to do it. Nonprocedural languages, also known as fourth-generation query languages, simply tell the computer what to do, and the language decides how to do it. An enormous improvement in programmer productivity and user ease has been associated with nonprocedural languages. However, these programs still require knowledge of a syntax-based language. Newer natural languages remove the requirements imposed by the language syntax. Nevertheless, they still require learning and extensive keystrokes and they allow for many mistakes.

Natural languages will probably not be a major new form of interfacing to a personal computer-based data base. Rather, the growth of "no" languages will fill this slot. With "no" languages, rather than entering keystrokes (except for specifying selection conditions and titles), a user indicates choices by simply moving the cursor key and pressing an enter key or responding with a mouse to pop-up menus that offer a number of options defined and limited by prior selections.

In future, as computing consumers increase their use of DBMS on personal computers, reviewers of software will concentrate less on comparisons of DBMS using criteria important to the developer, and they will learn to concentrate more on measures (such as the front-end interface) that are appropriate to the end user. Criteria will include measures that relate to success in minimizing the time spent performing a specific operation: learning time, required number of keystrokes, entry errors, eye and hand coordination and physical effort.

To date, well-established measures have not existed and, as a result, user interface design has in large part been misdirected. For example, it could be argued that some of the windowing programs currently on the market have become ends in themselves. They require substantial added computer resources (especially memory), impose additional learning and slow down operation, while giving the benefits seen for the novice user doing routine DTP.

"No" language interfaces will gain popularity even faster than natural languages because they better meet user needs. Simply stated, they require fewer keystrokes, reduce errors and dramatically shorten learning time.

The major functions of personal computer software are data management, word processing, graphics, spreadsheet analysis and statistics. These are equally important to both decision support and DP. The ability to perform all major functions with a common set of data is usually considered integration of software functions. The integration provided by spreadsheet-based programs, however, is generally not appropriate for the more demanding requirements of DP.

"No" language interfaces will gain popularity even faster than natural languages because they better meet user needs — they require fewer keystrokes, reduce errors and dramatically shorten learning time.

Integration within decision support software tends to be concerned with moving a few numbers from the spreadsheet

to a graphics display. This type of integration is important for decision support, but fails to satisfy typical DP needs. DP

requires the following:

- An ability to specify not the actual data to be moved, but the characteristics of the data. This means that the same functions can be performed automatically on a routine basis.

• Transfer of multiple sets of information in one pass of the data base. For example, to display a pie chart of sales by office for each product, the calculations of sales by office should be done for each product in one pass of the data file. This feature becomes particularly important when data files become very large.

- Intermediate storage between software functions of the information being moved, particularly where large files are involved.

The needs of software integration involve yet another dimension that will be



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satisfied by DBMS. The levels of data to be moved must be expanded beyond the items of information that appear in a window for one function and are needed by another. Three additional levels of data integration must be satisfied:

- The movement of record in the data base to other functions. One common task is to create an address list from the data base to merge with a form letter produced with a word processor. Another task is to move subsets of records and fields to become rows and columns of a spreadsheet to be used for analysis.

- The movement of the results and calculations performed on the data base. A user might summarize information contained in the data base for display in a pie chart or to update specific rows and columns of a spreadsheet.

- The movement of reports from the data base. A report might itself become a spreadsheet, or a report from the data base might be embedded directly in a word processor file for inclusion in a memorandum or other type of report.

For DP, a data base manager must be the centerpiece of the integration. The data base manager provides for better opportunities for filling-in-the-form data entry, multiple file management and multiuser access than can a spreadsheet or any other metaphor. Spreadsheets, WP, graphics and statistics must be viewed as devices for analyzing and presenting information contained in or calculated from a shared data base.

To date, most popular integrated software programs have had spreadsheets as the core module. The basic device for input and viewing has been a tabular row and column. In some cases, the data base has even been restricted to be memory resident. As the use of personal computers becomes more serious, the applications of a professional DP nature appear, the spreadsheet as the centerpiece must yield to the data base manager.

For serious applications will be possible without allowing for multiple file access — the ability to work with several relations simultaneously, as is the case in all data base managers as opposed to file managers.

The heavier duty requirements of DP also suggest the need for modules better fitted to the requirements of a specific application. Spreadsheet-based integrated products allow you to use only the modules provided.

Components are important for DP so that the routines used for data management, WP, spreadsheet analysis, statistics and graphics provide the full array of features required for production needs. Because of the routine and repetitive nature of DP applications, trade-offs in functionality are more costly than when made in the context of decision support.

The conclusion is that integrated DP software should have an open architecture. Components provided by one vendor should be tightly interwoven. However, the DBMS as the centerpiece should also allow for substituting and integrating software that a user may prefer at any given time. In short, the developer of integrated data management-based software systems need to provide both their own component modules as well as interfaces with other popular personal

As the use of PCs becomes more serious and more applications of a professional DP nature appear, the spreadsheet as the centerpiece must yield to the data base manager.

computer programs.

Visualizing the need for multiuser access to a data base in the context of the

personnel department operations described earlier is relatively easy. Often it will be the case that one person may be

entering data, another displaying specific records, a third preparing a mail list and so on. All need simultaneous access to the data base, which means the DBMS must provide record lock. File-locking software, often still advertised as multithreaded, is inadequate and inappropriate.

Multihuser features of personal computer DBMS must begin to meet corporate MIS standards. Two examples illustrate where these requirements are not being met adequately. One is for direct entry to transaction files instead of direct to a data base. This capability provides audit trails and allows for more efficient batch updates to the master files. This is especially important in a multitenant environment. For example, it is inappropriate for one workstation to be doing updates to the data file while another is printing a

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report; if both are done together, it is impossible to know whether the report reflected the updated record. Hence, the DBMS must support posting routines that allow for traditional methods and batch procedures for processing updates to multiple files.

Another example of a requirement for multilayer DBMS is improved data security. Pass-word security is certainly re-

quired at the file level, but should also be available at the field or record level.

Users interface with an application program. Earlier, we called this the front-end of the software and hardware tasks required to achieve a computing capability. The back-end also involves hardware and software,

the size and seriousness of the jobs performed on personal computers are growing faster than the capabilities of the hardware. Nowhere is this more evident than in the demand for multi-user access to data bases in work-area networks. Local-area net growth has not yet been explosive, but not because of lack of demand. Rather, the hardware and software combination provided by the popular net-

work vendors has been inadequate or too expensive for personal computer-based computing. The need for dedicating or degrading a workstation that serves as a file server, slow processing of shared data file requests and naive design of record-locking schemes have been the reasons.

As in mainframe design, back-end processors have emerged to satisfy heavier duty

DP requirements on personal computers. Additional processors will be used in the back-end. Processor chips are decreasing in price and being used more and more for specialized functions. We already see special-purpose math coprocessors, keyboard processors and video display chips. A natural extension is specialized hardware for higher performance data base access.

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Another feature required by more serious personal computer-based data base management is closer integration with mainframe data bases. Communications between mainframe and micro must be more tightly interwoven if personal computers are to be used successfully for DP in a business environment. The micro-to-mainframe links in some of the new integrated spreadsheets and other software programs still fall far short of what is required. Flat file containing data used by the personal computer user are not directly available on the mainframe. Nor are ASCII files the way information is used on the personal computer. Nor does movement of data in TTY emulation with 300/1,200 baud modems fully satisfy needs. Serious personal computer computing requires 3270 emulation, connected connection to the mainframe, fourth-generation query language, access to mainframe data bases and file structures and automated conversion to file formats used on the personal computer. A simple way to identify this requirement is to say we need quota on the mainframe, direct file transfer and conversion for the personal computer. Products that provide these capabilities are becoming available.

The early growth of microcomputers was mainly in the decision support area and was spurred by the VisiCalc and Apple software/hardware combination. A second leap in growth occurred with the advent of the IBM PC and Lotus' 1-2-3. Decision support applications will continue to grow but at a reduced rate. As hardware processors increase in speed, large fixed disks decrease in price and personal computers become an integral part of a corporate computing environment. The next quantum jump in personal computer growth will be for serious DP. The personal computer software industry needs to recognize this trend and understand its implications for software. The greatest impact will be in the design of the next generation DBMS.

Agile is vice-president of Martin Marietta Data Systems and president of ITSoftware in Princeton, N.J.



Keeping Track Of Human Resources

By Lee White

Human resources management is an application area desperately in need of order and efficient recordkeeping. Personnel departments must contend with the nightmare that results from the amount of paper generated, the number of records required and the length of time these records must be held. This situation is particularly complicated in relation to government requirements for affirmative action and equal employment opportunity (EEO) reporting, which require complex cross-filing and

cross-indexing to make information available quickly.

A number of mainframe software packages on the market today have come a long way toward solving the problems inherent in this paper- and record-intensive field. The more sophisticated of these packages are comprised of modules. The modules can often be purchased and operated independently, but can also be integrated with one another and with comprehensive payroll software to create a system that can track almost anything a company or government might require.

This article will focus on a representative sample of mainframe-based application software packages that include both human resources management and payroll

modules. The packages all purport to do the same things, and interview with vendors tend to support vendors' claims. However, as is the case with most software, the vast majority of users of these packages were also involved in selecting the package for their companies. These users made their selections on the basis of literature, vendor demonstrations and discussions with other users (most of whom had also been involved in selecting the packages for their companies).

The caveats that pertain to the purchases of these packages are the same that apply to any other large, costly and complex system. Is the system likely to be a success? Is the company financially stable? Are there hidden costs such as documentation, training, upgrades, technical support? Is there a large installed base?

The two most critical issues, however, are defining — as narrowly as possible — the needs of the organization and deciding whether the cost of purchase and implementation is justified. In the area of human resources management and payroll, these issues are particularly difficult because the system cannot always give short-term, easily quantifiable, bottom-line cost savings.

The three systems that will be reviewed are the ISI Advanced Human Resource System from Integrated Systems, Inc. of Walnut Creek, Calif.; HR-Microsense, from McCormick & Dodge Corp. in Natick, Mass.; and the MSA Human Resource System from Management Science America, Inc. (MSA) in Atlanta, Ga.

The ISI Advanced Human Resource System accommodates and supports the administrative requirements in the management of human resources. The system consists of four modules — Advanced Payroll, Advanced Personnel Management, Advanced Applicant Tracking and Advanced Position Control — and permits either independent implementation of the components or integration of all the modules. In addition, the system includes complete on-line capabilities. Personnel and application information can be entered and maintained in a real-time environment. Time reports and payroll adjustments can be entered in an on-line mode with editing and batch controls. Inquiry is available to the employee and applicant data bases and to the payroll and employment history files. ISI provides on-line security features that restrict access and protect data from unauthorized updating, according to the vendor.

Hardware requirements for the ISI system are IBM's 360 or 370; 4300 series; 3080 series and 3090, and Unisys' UniSystem 30 or 38 or Honeywell-Packard 64, 1100-3000. The price range for the ISI system (for all hardware configurations except the System/38) is from \$125,000 to \$250,000, depending on the number of modules selected. The System/38 hardware is priced at \$35,000 per module.

The Advanced Position Control module provides a framework for staff planning, human resource development programs, budgetary controls and monitoring and recruitment initiation functions. The position data base within this module includes information that defines each current or planned position.

The Advanced Applicant Tracking

module aids the selection process by reviewing which applicants are best qualified for open positions. EEO summaries are provided on each applicant report to allow close monitoring of affirmative action goals. Also provided in this module is the capability to meet the reporting requirements of the Equal Employment Opportunity Commission (EEOC) and the means to respond to discrimination suits. A list of events such as reference checks, job offers, interview dates, examination scores and other information is included to allow monitoring of the applicant's status during the selection process.

The Advanced Personnel Management module includes such as job status, benefits participation, static inventory, basic personnel and demographic information and payroll-related information. A

useful part of this module, the Personnel Action Planner, can be company-defined to meet specific organizational requirements. This form can record personnel actions such as initial employment, promotions, leaves of absence and transfers. The final module is Advanced Payroll, which computes federal, state and local taxes and supports payroll disbursement, payroll setting, payroll history and benefits and deduction administration, according to the vendor.

Advanced Micro Devices, Inc., of Sunnyvale, Calif., is a manufacturer of integrated circuits and employs 6,200 people in its domestic operations in Sunnyvale and Austin and San Antonio, Texas. The Sunnyvale location has been on line with the personnel piece of ISI's system since April 1983. Advanced Micro Devices is

not using all the modules; the company is presently using the personnel and promotion/transfer modules and is about to install the applicant system. Don Drucker, human resources systems manager, served as project manager for the ISI implementation; he said: "In his view, the governmental report writing capabilities were not the strongest parts of the system. "The big problem is getting the data clean, validating it and making sure everybody has good codes. Anybody can write the reports to dump it out in the format of the government. We've designed our own in-house system for applicant flow. Everyone who applies fills out a self-identification form, and we read it into a [Mathematics Products Group, Inc.] basic system and run reports off that."

Advanced Micro Devices is not using ISI's payroll module, but Drucker has designed an interface from the ISI personnel module to the Bank of America payroll system. One of the great strengths of the ISI system, he said, is its potential as a foundation for implementing some of the more sophisticated human resources applications such as career development and succession planning. All the data elements necessary to accomplish the applications, including skills, training, education and previous experience, are built into the ISI data base. Drucker said he doesn't believe any problems with the implementation have arisen because he hadn't encountered any problems in the past; he added that Advanced Micro Systems is generally pleased with ISI, although most of the support is provided

in-house. Only one programmer has gone through the training; the system was put in prior to initiation of ISI's formal training classes.

Another user of ISI is Stephen Hinsold of Vitro Corp., a subsidiary of Penn Central Corp. Vitro provides engineering services under contracts with the U.S. Department of Defense and supports 6,000 employees in its Silver Spring, Md., headquarters and its 30 field offices throughout the U.S. Hinsold, manager of payroll at Vitro, said a year ago he signed a contract with ISI in September 1982.

To smooth the installation procedure,

representatives from payroll, personnel

and data systems joined the implementation team. During the final four months of installation, the older batch payroll system was run side by side with ISI. A hot line was set up to answer employees' questions, but by the fourth pay period, calls had trickled to almost zero and the hot line was discontinued.

Vitro has documented, quantifiable results from the payroll arm of the ISI system. Under the previous system, it took 25 employees five days to complete a typical payroll run with the ISI system, 15 employees complete the process in fewer than three days. In addition, most personnel information can be accessed in less than one minute, Hinsold said.

Like Vitro, the city of Cincinnati also

employs about 6,000 people; with the exception of the Applicant Tracking unit,

the city has all of the modules operational and on-line. The personnel part of the system has been up since October 1982, and the payroll and position control portion has been operating since July 1983. Cincinnati recently purchased the Applicant Tracking module and expects to have it operational by the end of 1985.

Bernie Menke, a computer project manager for Cincinnati, headed the development team that put up the ISI system. He said the system eliminated a great deal of the manual recordkeeping. For example, complete sets of records in the central personnel office were thrown away after the number of duplicate sets kept at departmental level had been reduced. In addition, payroll processing is smoother and more accurate and the error rate for returned checks or requests for replacement has dropped dramatically. "With the first payroll we issued, we did not have a single



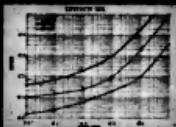
It used to take 25 employees five days to complete a payroll run; with ISI 16 employees complete the process in fewer than three days.

incorrect check, not one error. It just boggled my mind," Menke said.

The personnel recordkeeping capabilities of the system are impressive, Menke said, and management decisions are now much easier because of the management-level information readily available on the system. In addition, the city was able to file the ESS report in a direct output from the system and it was accepted by the federal government. The city did not implement a skills inventory data base, by virtue of management decision, but the system would provide this capability if the decision were reversed at a later time.

ISI's support gets high marks from Menke, who has worked with other packages during his career. His prior experiences with those packages made his wary, but he added, "I just can't say enough good things about [ISI's] support. ISI was just dramatically different from the others." Although no formal training classes existed when Cincinnati bought the system, ISI sent its people to Cincinnati to train the project team, and the project team then trained all their users. Although quantifiable numbers may not be apparent, "without [ISI], I don't know where we'd be today," Menke concluded.

HR-Millennium, the integrated personnel and payroll package from McCormick & Dodge in Natick, Mass., coordinates and controls payroll and personnel information. The software boasts extensive system capabilities including multi-company processing, comprehensive testing and reporting modules, detailed work force analysis and real-time updating.



The option runs on IBM's 4300 and 3080 mainframe computers, and its price — less than \$300,000 — includes payroll and personnel modules, report writers, training, automatic upgrades, on-line capabilities and hot-line support.

Millennium's payroll module pays employees by check or direct deposit; calculates retirement increases; handles federal, state and local withholding taxes; accumulates payroll hours and dollars by project, cost center and job stores career history; and allows automatic transfer of payroll expenses with a general ledger interface.

The personnel package handles information on job and personal data and his-

tory of illnesses and injuries; generates detailed reports to monitor company compensation plans; maintains education and skills information for career planning and internal recruiting; produces EEO reports; analyzes work force utilization by comparing current staff to labor market statistics and Affirmative Action Plan goals; and reports adverse impact of transfers, promotions and new hires.

Part of Millennium's extended system capabilities is tracking applicant flow when information to support hiring decisions is necessary — a critical function in EEO or Office of Federal Contract Compliance Program litigation, for example.

Pete Poole is a group manager in the Information Systems Department at the 5,000-employee Baptist Medical Center in Birmingham, Ala. The hospital pur-

chased the entire package from McCormack & Dodge, but has fully implemented only the payroll module, which has been in operation for over a year. They have begun to use the personnel and position control portions and are in the process of inputting data. The hospital expects to begin using the parts for affirmative action, Occupational Safety and Health Administration reporting, benefits reporting and automatic deposit sometime in 1985. Poole characterized the conversion procedure as "real clean," and attributed the success primarily to McCormack & Dodge's support. "We've called them on a Saturday night, and they were here on Sunday morning," Poole said.

John Bass, director of employee relations at Bronson Hospital in Kalamazoo,

Mich., also gave high marks to McCormack & Dodge's support. "They preach service, and they do back that up," Bass said. Bronson has been on line with the entire Millennium package, running in a parallel mode with the hospital's older, homegrown system, since December 1984 and Bass said he anticipates that Millennium will fill the hospital's needs. At present, there are 2,500 employees at Bronson, which includes the parent company, Bronson Health Care Group. The decision to choose McCormack & Dodge was influenced by the fact that Millennium supports a microcompany group.

Members of Bronson's implementation team attended forums offered by McCormack & Dodge during 1984 and found them very helpful. In addition to the implementation team, there was also a management team headed by Bass. "The implementation team had responsi-

Part of Millennium's extended capabilities is tracking applicant flow — a critical function in EEO or OFCCP litigation.

bility to go to classes, learn the system and do the day-to-day work of implementing the system. [The management team] was there for referrals and to answer basic policy questions," Bass explained.

Bronson Hospital is running Millennium on an IBM 4341 and has recently purchased an IBM 4381. Some of the motivation in response had occurred, which was one of the reasons for purchasing the new computer, Bass said. "It takes a lot of space and a lot of memory. It generates a tremendous amount of information."

Management Science America, Inc. (MSA), in Atlanta, Ga., boasts the largest installed base with well over 2,000 organizations nationwide using its system. The supported technical environments for the MSA Human Resource System are IBM's 3300, 3030 and 3080 computers, under MVS/XA, MVS, OS, DOS, DOS/VSE, SSS/VSE, IBM pug-compatible; Honeywell, Inc.'s DPS4, miniaturized large computer Corp. computers; the Evans, Unisys, T1000 and NCR Corp.'s VRX. The price range is from \$120,000 to \$175,000, depending on the modules selected. Available modules are the MSA Payroll System and the MSA Personnel Management and Reporting System.

The MSA Payroll System provides automated recordkeeping; computation of federal, state and local taxes; and includes a special report generator to create reports without DP assistance. Other enhancements available within the system include deductions and employer-paid benefits, automatic payroll deposit, individual Retirement Account and 401(k) deductions.

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The personnel module of the MSA system includes applicant tracking; employee information such as personal data, skills and performance reviews; skills inventory; benefits participation; and EEOC and Affirmative Action reporting. Also available are extended personnel capabilities such as position control, benefits/Employee Retirement Income Security Act compliance, employee and labor relations and career development.

Solar Energy Research Institute in Golden, Colo., a beta test

MSA boasts the largest installed base with well over 2,000 organizations nationwide using its system.

site for many MSA products, has been on line for more than two years. At present, 550 employees are part of the payroll and personnel system, which is running on an IBM 3031. According to senior project manager Paul Dragseth, who was project leader for MSA implementation, Solar Energy Research Institute is using most of the packages, except for applicant flow (which is installed but not implemented) and position control. The company is using the system to file its EEO report, but cannot use MSA for its other reports. "We have some special reporting that has to be done that MSA doesn't provide because we're a DOE [Department of Energy] contractor," Dragseth explained. Dragseth and others from Solar Energy also found Interact's formal classes and Interact — MSA user group meetings — valuable. He also applauded MSA's support, but said Solar Energy's own technical support solves most problems.

Joe Peruzzelli, senior systems analyst in the Corporate Information Systems Department of American Hoechst Corp. in Somerville, N.J., also said he benefited from Interact, especially in the startup days of the MSA system. American Hoechst is a veteran user, having installed the system in July 1975. About 9,000 employees are on the system, which is running on an IBM 3084. The system is on line, but not in a real-time mode. Although the company is using the system extensively, it has chosen to create its own reports using Panaphic Systems, Inc.'s Easytrieve, in place of those provided by MSA. American Hoechst does pull information from MSA for these

reports. The company has also discontinued using the position control portion of the package, finding it "unnecessary," Peruzzelli said.

Another MSA user is Paradyne Corp. in Largo, Fla. Since April 1984, Paradyne has been on line with most of the MSA modules, including position control, life-to-date history, benefits and payroll. Joyce Daley, employee information man-

ager in the Human Resources Department, was project leader of the MSA implementation team. Daley said the best part of the system is "ownership of the information. When we had a service bureau doing our payroll, the only thing we owned at the end of it was checks."

Paradyne makes good use of the system's report-writing capabilities, particularly the special report generator, for labor

reports, payroll and personnel. Daley praised the benefits statement generator, which can read the entire system including the payroll portion.

Daley has attended many of the MSA classes and will soon attend MSA's expert classes. She and members of the DP and payroll have gone to Interact.

Last year's Interact was particularly valuable because Paradyne had just gone on line. "Here we

were with this new system, wondering who was in control. Interact allowed us to talk to other users, and it gives us a good feel for how other people were using the system. You get so wrapped up in getting it to produce checks that you don't look at the big picture."

White is a senior writer at Computerworld Focus.

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Manager's Corner

By Michael E. Lawton

The demands placed on many DP departments force them into a fire-fighting routine that leaves little room for essential long-range planning. However, planning is playing an increasingly important role and information systems managers cannot ignore one important component of all long-range plans: ensuring that information systems professionals possess the education necessary to maximize their impact on the organization. Two kinds of education are appropriate: technical training, to ensure currency in a very fluid market, and management education, to improve the effectiveness of information systems personnel.

Effective courses for technically oriented people fall into four categories. These courses can improve the way organizations will be managed, the way information is presented and the quality of analyses conducted on behalf of the organization. The courses cover the following ground:

- Improving the way information systems professionals communicate ideas and plans. A good course would stress the organization of information and its presentation as well as techniques that would help the presenter analyze audience differences with the intended audience. An effective program would videotape presentations and offer detailed critique sessions.

- Evaluating the costs and benefits associated with management information systems projects. A good course would develop techniques for analyzing the financial aspects of a systems project and would utilize these techniques to produce a structured analysis of the costs and benefits of a project. After taking this course, the analyst should be able to deal with issues such as investment timing, flow of funds and risk. Finally, this type of course would describe how such complex analyses are most usefully presented to management.

- Realizing the importance of finance and accounting in the life of any organization. This course would familiarize information systems professionals with the

fundamental concepts of accounting and finance. An important goal would be imparting an understanding of financial statements and the effect of various financial transactions on the organization. Strong programs would develop an understanding of the impact of inflation on financial decisions. How to prepare a capital budget would be of real value, as would information describing the general budgeting process of the organization.

• A comprehensive management development program for information systems professionals. This course would cover the major components of a business or management education. Modules on accounting, finance, operations, marketing and business strategy would be included. A marketing module, for example, would cover competitive evaluation, market segmentation, product mix, promotion and perhaps sales management.

Duration of these courses can range from two or three days to several weeks or more. Courses could be developed in house or might be delivered by outside organizations — other companies that specialize in delivering continuing education courses for business or the continuing or executive education departments of major universities.

Be clear about the educational goals you are setting and how these courses will help you meet specific objectives to improve staff productivity. With that task behind you, develop a relationship with an organization interested in helping you meet those goals. Two pointers: Do not buy off-the-shelf courses before you investigate the organization's willingness to tailor educational programs to your needs. Second, check out the programs by talking to someone who has been enrolled before.



Lawton is director of the Masters Program in Management Information Systems at Boston University's School of Management.

Q&A

(Continued from Page 3)

would be more from the supermini down to the microcomputer level. Mainframes are still a direct-from-vendor market. In any case, the VAR market is going to become fragmented, with the basic divisions drawn between micro-specific VARs and the larger systems VARs.

In the last few years, IBM gained publicity with the active promotion of its own VAR programs. What role does IBM play in all of this?

IBM's interest in the VAR value-added dealer channel is to penetrate markets it can't tap through its retail channels or direct sales forces. IBM wants to make sure it's active in distribution channels that might take off in the future. It doesn't want to be left in the dust.

How large is the U.S. microcomputer VAR market?

The 1984 U.S. micro VAR market of \$4.3 billion will reach almost \$14 billion by 1988. These figures include all micro and stand-alone systems.

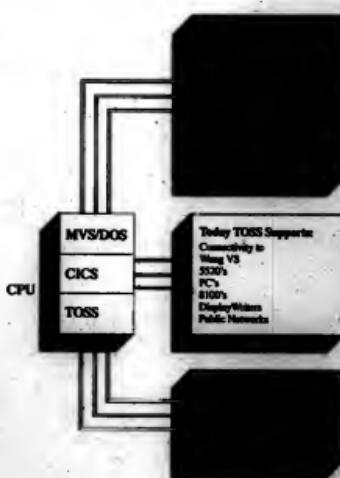
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Products

NEW ROCHELLE, N.Y. — Respond, a series of communications software modules from Software Synergy, Inc., provides terminal emulation for IBM Personal Computers to allow access to subscriber information services, mainframes, minis and other micros, according to the vendor. Several popular programs such as Lotus Development Corp.'s 1-2-3, Multicore Corp.'s Multicore and Ashton-Tate's DBase III can also be accessed through Respond, Software Synergy said.

Respond reportedly lets users transfer any kind of text or binary data as well as data base files, screen by screen line by line, to either a host or printer. Data can be sent and received automatically and simultaneously, the vendor said. Respond/All, one of the eight software varieties available in the series, offers asynchronous and synchronous communication through a single product, according to Software Synergy.

Prices range from \$175 for the Respond/Any module to \$953 for the Respond/All module. Further information is available from Software Synergy, Inc., 465 Main St., New Rochelle, N.Y. 10801.

TRUMBULL, Conn. — Canaan Computer Corp. has introduced Multigate-PC and Multigate-VM, two communications products providing IBM Personal Computer users with interactive access to PC-DOS and VM/CMS applications running on personal computers, IBM System/370 mainframes and Canaan Corp.'s own DCS 5400 departmental computers.

Multigate-PC consists of PC-Server, a program that places an IBM PC in a Canaan terminal emulation mode, and Canaan Server, a program allowing personal computer users access to DCS 5400 storage and security features, according to the vendor. Multigate-VM reportedly provides a gateway between IBM PCs and an IBM VM mainframe, as well as allowing the exchange of PC-DOS and VM/CMS files between two DCS 5400 computers or from a DCS 5400 to an IBM VM mainframe.

Multigate-PC, including software and catalog, costs \$1,195 per yearly maintenance; for \$125, Multigate-VM is licensed for \$99 per month. More information is available from Canaan Computer Corp., 39 Lindeman Drive, Trumbull, Conn. 06611.

VIENNA, Va. — Boeing Computer Services has announced Boeing Calc, a financial spreadsheet package targeting companies with finance, planning and consolidation needs that have outgrown the limits of memory-bound single-page spreadsheets.

Boeing Calc permits the formation of up to 1,000 pages of rows and columns, enabling financial data to be broken into manageable segments, according to the vendor, and separate pages can be defined for departments, divisions, auditoriums and so on. Information is then uploaded to the mainframe module of Boeing Calc for merging into a centralized corporate spreadsheet for consolidation and comparative analysis, Boeing said. Boeing Calc can also read standard DIF files as well as Lotus 1-2-3 files.

The microconversion of Boeing Calc runs under PC-DOS or MS-DOS on IBM Personal Computer XT and compatible micros; the Boeing Calc mainframe module runs un-

der MVS/TSO for 4380 series and 30 series mainframes. The microcomputer module is priced at \$369 per copy, and the microcomputer to mainframe package is \$5,095, the latter consisting of one copy each of the microcomputer and mainframe modules. For more information contact Boeing Computer Services, 7980 Colonnade Court, Vienna, Va. 22120.

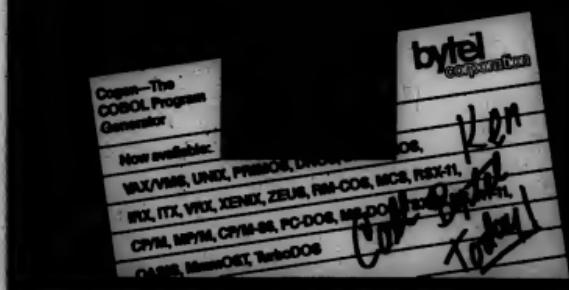
NEW YORK, N.Y. — Coddington Systems Corp. has offered Vterm 4010, software that reportedly combines Tektronix, Inc.'s 4010 and 4014 terminal emulation, Digital Equipment Corp.'s VT100 terminal emulation, four error-correcting file transfer protocols and general communications capability. Running on

the IBM Personal Computer, Personal Computer XT, Personal Computer AT, IBM Portable and on several compatibles, including Data General Corp. One, AT&T 3300 and Compaq Computer Corp. Deskpro, Vterm 4010 claims to run all host software written for a Tektronix 4010, including Integrated Software Systems Corp.'s Tel-A-Graf, SAS Institute, Inc.'s Sas/Graph and Plot-10. The software also reportedly provides printer and plotter support, throughput to 9,600 bps/sec communications, disk capture of graphics and text, support of Microsoft Corp.'s mouse, programmable soft-key macros, on-line Help, automatic dialing, horizontal and vertical scrolling and a 132-column display.

To run Vterm 4010, users need an asynchronous communications board, a graphics adapter that will drive either an IBM monochrome or color monitor, 192K bytes of random-access memory, PC-DOS 2.0 through PC-DOS 3.0 and at least one floppy disk drive. Vterm 4010 can also be copied to and run from a hard disk, the vendor said. Vterm 4010 is priced at \$249 from Coddington Systems Corp., 611 Broadway, New York, N.Y. 10012.

WESTBORO, Mass. — State Control Corp. has announced its Desktop Computer Model 45, a dual processor, multi-user system that runs Desktop/UX, a native Unix operating system based on

"There comes a time when you must use



Products

AT&T's System V operating system. The Model 45 can run both the Motorola Inc.'s 68000 microprocessor and DEC's MicroVax processor; the dual architecture is said to allow the MicroVax processor to offload I/O operations from the 68000, which is dedicated to running Unix applications. The microVax processor also supports a range of Desktop Generation peripherals such as printers, storage devices and terminals.

Desktop/UX offers the standard Unix Bourne and C shells for development, includes a C language compiler and is upwardly compatible with DG/UX. DG's native Unix for its 32-bit processor. For communication in multivendor networks, Desktop/UX supports the TCP/IP

networking protocol and UUCP, a Unix-to-Unix networking protocol.

A basic Model 45 configuration includes 512K-byte random-access memory, 154M-byte hard disk, one floppy disk drive and is priced at \$11,845, the vendor said. The system supports up to eight users and can be configured with memory up to 4M bytes and hard-disk storage up to 142M bytes. A Desktop/UX license is \$1,800, and a TCP/IP license for the Model 45 is \$750. For further information, contact Data General, 4400 Computer Drive, Westboro, Mass. 01580.

KING OF PRUSSIA, Pa. — SoftSwitch, Inc. has announced a software bridge to link IBM's Domes distributed

office system to the Soft-Switch electronic document system. According to the vendor, the Domes bridge provides transparent distribution of text documents between Soft-Switch users and Domes users and Domes users can exchange revisable text documents with users of non-IBM systems such as Wang Laboratories' SPS, Xerox Corp.'s 860 system; and NRI, Inc.'s 3000. IBM systems supported include the Displaywriter, the 5520, 6640, 6670, OS 6, DCF, Profs and Domes. Personal computer software supported includes IBM's Displaywriter 2 and Multimate from Multimate International. Soft-Switch is a document control system that runs on an IBM host computer under MVS or VM

operating systems. The Domes bridge is \$30,000 (\$16,000 if the required Soft-Switch DCA translator is in place) from Soft-Switch, Inc., 200 N. Warner Road, King of Prussia, Pa. 19406.

MAYNARD, Mass. — Digital Equipment Corp. has introduced four networking products, including two packages linking the DEC Rainbow and the Ultrix operating system to Decnet networks and two terminal server products linking terminal users to systems on Decnet.

Decnet-Rainbow software provides file transfer capabilities for sharing data across a network, remote resource access for sharing peripheral devices, task-to-task communications for developing distributed applications and a terminal manager designed for tracking the status of a network, the vendor said. Decnet-Rainbow is scheduled for this fall for \$295. Decnet-Ultrix software, for DEC VAX and Ultrix systems, reportedly enables users to transfer data and files between Ultrix and VMS. DEC's VAX operating systems. Users are also said to be able to communicate with a Unix-based system because the TCP/IP protocol, a standard protocol used by the Department of Defense, is common to both Unix and Ultrix. Decnet is scheduled for August for \$1,000 in the Ultrix 32K-byte Microway configuration and \$2,000 in the Ultrix 32-VAX configuration.

The Decserver 100 is a network terminal switch for connecting up to eight asynchronous terminals to a mainframe system on Xerox Corp.'s Ethernet network. Terminal Server Version 2.0 software, which runs on DEC's Decnet Ethernet Terminal Communication Server hardware, reportedly allows users to connect any non-DEC computers to DEC's local-area network. Users also have the ability to connect any local or remote terminal via terminal server to any system in the network. Both the Decserver 100 and Terminal Server Version 2.0 software are scheduled for release in June and are priced at \$2,800 and \$1,000, respectively. For more information contact Digital Equipment Corp., Maynard, Mass. 01745-2195.

NEW YORK, N.Y. — Systems Strategies, Inc. has announced SNA/3270, a software package that reportedly allows Asci terminals and printers to access an IBM Systems Network Architecture (SNA) network as though they were true 3270 devices. According to the company, SNA/3270 is transparent to all IBM subsystems including TSO/SPP, VM/CMS, CICS, IMS and VTAM; with no host modification required. The system can be defined to have a number of different 3270 configurations, while synchronous data transmission parameters, terminal and printer options and assignments can be respecified for different IBM networks.

SNA/3270 requires no operating system — all scheduling, tasks and queue management are performed by the internal IPC software, the vendor said, and this enables the package to run under any interactive terminal environment. If the operating system is available, the system will execute in stand-alone mode.

SNA/3270 emulation software is comprised of four on-line modules: SUDC protocol; SNA protocol; the 3275 terminal emulator, which performs presentation services, data stream processing and the 3278-to-Asci terminal translation;

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MARK V® HELPS MINIMIZE NEED FOR IMS-TRAINED PROGRAMMERS

"MARK V is helping us to respond faster to user requirements in a timely fashion, while minimizing the need for a heavy IMS investment," says Miller Bradley, Systems Consultant and MARK V Product Manager at Attomos Service Corporation, a division of Informatics General Corporation.

MARK V is an online application generator that can increase programmer productivity by 50 to 80 percent. The development tool allows the programmer to specify what functions the program is to perform, with minimal knowledge of IMS data base processing or other interacting components.

Attomos Public Services has been using MARK V, a batch-oriented system, for several years now, on the mainframe. The vendor had built up a considerable MARK IV product development experience by the time MARK V was brought in. This MARK IV talent has been a great asset in tailoring MARK V programmes for the new online applications the company is developing, Bradley notes.

"In the MARK V applications we've developed so far, we've found that the bulk of the system can be done by someone with little or no experience in COBOL, a database management system from IBM or otherwise. If the programmer is familiar with MARK IV and its hierarchical structure, for example," he explains.

"I believe the programmer needs to have some feel for the IMS environment, but not necessarily at the level that IBM programmers do."

However, Bradley continues, it still is necessary to have an IBM-trained consultant or data base administrator involved in the application development to ensure that IMS efficiencies are maintained.

The first test for MARK V was a tie-in with the existing customer information system to allow charitable contributions with utility payments. It had to be done in one week and went fast, an economic sensible package and enhancement. Applications were developed in Data Base Manager, a graphical interface to the table-oriented system and the IBM Data System. The system's pay-off performance function was the reason for overall steady, yet very user friendly system, including modified functioning and limited cost.

One user was so pleased that they changed directions from a total and one now committed to the milestones, an IBM 3081, Payroll/Personnel Systems Supervisor, Bradie relates. "I now have a tool which is much more user-friendly, and it's much more reliable than our previous software," he adds. "It's extremely popular and used by the majority to enter data, to enter transactions and to generate reports." Some grants go to add, "The company is pleased and satisfied by the success in using MARK V and plans its use in many future applications."

This set the stage for the most important use of MARK V as far as an enhancement to an existing COROL Gas Services request system to provide dispatching and management with more extensive and their information. "The system was developed in MARK V and is currently being used by the company," says Mark Orr, Supervisor, Gas Systems. "We are convinced that we could not meet the schedule deadline with a programmed language."

The first step was to use a one week MARK V class that Bradley taught to Orr's group. Rather than doing the standard class problem, the students programmed two menus from the actual gas

application development report: MARK V

"Unlike the programmer needs to have some feel for the IMS environment, but not necessarily at the level that IBM programmers do, the developer needs to understand what needs to be done to write IMS COBOL."

system. One menu had a working subsection by the end of the first day. Because of the graphic menu, the class focused on extensive high intensity logic and many graphics. Once the class ended, the heavy development began and the system was installed on time. However, it became clear that the response time was unacceptable, primarily due to buffering through the secondary index and message processing. A redesign effort was undertaken, using MARK V to do more basic conversion and modification of the MARK V. In the process, the original view part of the system was left in production by removing certain MARK V requests. It was in this two week redesign effort that MARK V excelled, says Orr. "Module interdependence allowed reconfiguration of functions for performance improvement in weeks or months." The final result left nothing on the face of Corporate and Computer services management, the user and technical staff.

"So far, we've had success using MARK V for smaller applications, especially those with severe time constraints, but I think many of the enhancements have made it a viable product for large-scale systems," Bradley adds. "I particularly like the fact that with the dynamic action codes, multiple data base updates, data base conversion, replication capabilities and, of course, the Program Function keys."

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LAKE OSWEGO, Ore. — Unify Corp. has announced Unify 3.2, an enhanced version of Unify 3.2, an enhanced version of Unify, the company's Unix-based relational data base management system. Unify 3.2 features include a one-step data base creation procedure, improved menus, improved transaction logging and new documentation, the vendor said.

Unify 3.2 consolidates four separate functions — define data base, create data base, define screen and define menu — that reportedly allow users to develop data base applications by simply defining how the data base should look. Unify 3.2 will then automatically create the data base upon that definition, the vendor said. The new system menus permit users to move quickly from one function to another without having to exit to the Unix shell, while an optional transaction logging keeps track of logical transactions for greater security, Unify said. Three levels of documentation include tutorial and reference materials for beginning and experienced users; a "programmers' manual" that defines Unify's open system approach and enables sophisticated users to access the host interface language.

Unify 3.2 will be distributed to OEM and other customers at single-copy prices ranging from \$1,495 to \$14,500. For more information, contact Unify Corp., Building Two, 4000 Kruse Way Place, Lake Oswego, Ore. 97034.

PALO ALTO, Calif. — Micro Focus has introduced its VS Cobol Workbench development tool, which the company said allows fast, uninterrupted mainframe program development, testing and maintenance of programs downloaded to an IBM Personal Computer. The programs are then uploaded to the mainframe for integration testing and run-time.

The VS Cobol Workbench reportedly allows OS/VSE Cobol and Cobol II syntax to be used separately or to coexist in a single program, enabling conversion of OS/VSE Cobol programs to VS Cobol II via flags that report errors in code from one syntax to the other. VS Cobol Workbench also allows programmers to test calls or embedded host command languages (EXEC statements) to host data base and data communications services such as IMS, CICS, DL/I, SQL/DS and DB2, according to Micro Focus. This capability permits the programmer to simulate the mainframe's response to the calls by storing test data values inside the VS Cobol Workbench software, the vendor said, enabling the programmer to maintain and develop programs through to module and program testing off line on the IBM PC.

The company claimed VS Cobol Workbench also makes application testing easier through its optional Session Recorder, which allows automatic recording to disk of all programmer keystrokes during a test session. The keystrokes can then be played back for regression testing or other purposes and edited to keep in step with program changes. VS Cobol Workbench supports the IBM Personal Computer, Personal Computer XT, Personal Computer AT, Portable PC and 3270 Personal Comput-

er. Single-copy price is \$4,000 from Micro Focus, 2445 E. Bayshore Road, Palo Alto, Calif. 94303.

WALTHAM, Mass. — Honeywell Information Systems, Inc. has introduced its Infowin Videocon System, which reportedly enables local and remote users to dial into a central computer for instant retrieval of textual and graphic information. Infowin is based on the French Attelop videocon protocol, but is otherwise protocol independent. Honeywell claims Infowin is standard on all its systems in concept to a printed book's table of contents; users reportedly can locate a desired category of information without having to know anything about computers or terminals or how the videocon data base is structured. Users can bypass the menu for more direct information retrieved by

key-activated. The terminals contain a fold-down keyboard, 9-in. 40-line-by-24-char. monochrome display screen and built-in modem for communications with the central system.

A VT-Link adapter board and emulation software are available to allow a Honeywell Microsystem Personal Computer, IBM Personal Computer or IBM Personal Computer XT to function as a user terminal. Guided by a series of menus that work like a book's table of contents, users reportedly can locate a desired category of information without having to know anything about computers or terminals or how the videocon data base is structured. Users can bypass the menu for more direct information retrieved by

entering mnemonic codes or designated key words, the vendor said.

A group of three preconfigured Honeywell DPS 6 microcomputers can be used as the Infowin control system. These three DPS 6 central systems, including Infowin videotext software, electronic messaging and a console terminal, sell for \$63,000, \$316,000 and \$173,000, respectively. Minitel terminals are priced at \$650 each with volume discounts available. A Honeywell microsystem PC for use as an IP terminal sells for \$4,635, while the SA terminal is priced at \$795 for a VTP7301. The Infowin system is priced at \$1,990 for a VTP7301. For further information contact Honeywell Information Systems, Inc., 200 Smith St., Waltham, Mass. 02454.

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May 13-15, Washington, D.C. — CADD/CAM Management, Evaluations and Implementation. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 13-15, New York — The IBM PC, Also, Nov. 15-17, Denver, May 20-22, Houston, May 26-27, Chicago, May 28-31, Detroit, June 2-3, and June 5-7, Newark, Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

May 15-16, New York — Market and Product Strategies in Office Automation. Contact: MSRA, Inc., Room 1605, 150 Broadway, New York, N.Y. 10036.

May 20-22, New York — Information Center Software Selection. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 20-22, Los Angeles — Commercial Artificial Intelligence. Contact: Gartner Group, Inc., P.O. Box 16212, Stamford, Conn. 06904.

June 3-5, Boston — PCs & Corporate Information Strategy. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

June 3-5, Buford, Ga. — Display/Graphics Terminal Industry Confer-

ence. Contact: Datquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131.

June 10-11, London — Proke Research International Conference on Voice Processing, Contact: P.O. Box 66, Luton, Bedfordshire, LU3 1PS England or Proke Research Inc., P.O. Box 590, Morris Plains, N.J. 07960.

June 10-12, Detroit — Project Planning, Scheduling and Control Using Personal Computers, Also, June 17-19, Dallas and June 26-28, Boston. Contact: American Management Association, P.O. Box 319, Saranac Lake, N.Y. 12963.

June 12-14, Anaheim, Calif. — Info/West. Contact: Info/West, 999 Summer St., Stamford, Conn. 06905.

June 17-19, New York — PC Expo. Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

June 17-20, Washington, D.C. — System XIII Conference and Exhibition. Contact: Association of Information Systems Professionals, 1015 N. York Road, Willow Grove, Pa. 19090.

June 19-20, New York — Office Systems Implementation Strategies: Maximizing Returns on Investment. Also, June 25-26, San Francisco. Contact: The Yankee Group, 14th Floor, 89 Broad St., Boston, Mass. 02110.

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